SEPTEMBER, 1958

American Engineer

U. S. ENGINEERS VIEW SOVIET CONSTRUCTION

By James D. Piper, P. E.
Vice President for Promotion
Portland Cement Association

During ten days of inspection tours and conferences, the author acquired a broad picture of construction activities in the USSR.

In this Issue:

The Place of the Engineering Technician by G. Ross Henninger, P. E., Director, National Survey of Technical Institute Education, and President, Ohio Mechanics Institute

A Symposium: Professional Development of Engineering Students for Industrial Careers

Plus—NSPE Film Announced . . . 1959 National Engineers' Week News . . . Fall Meeting Plans . . . Latest Legislative Developments

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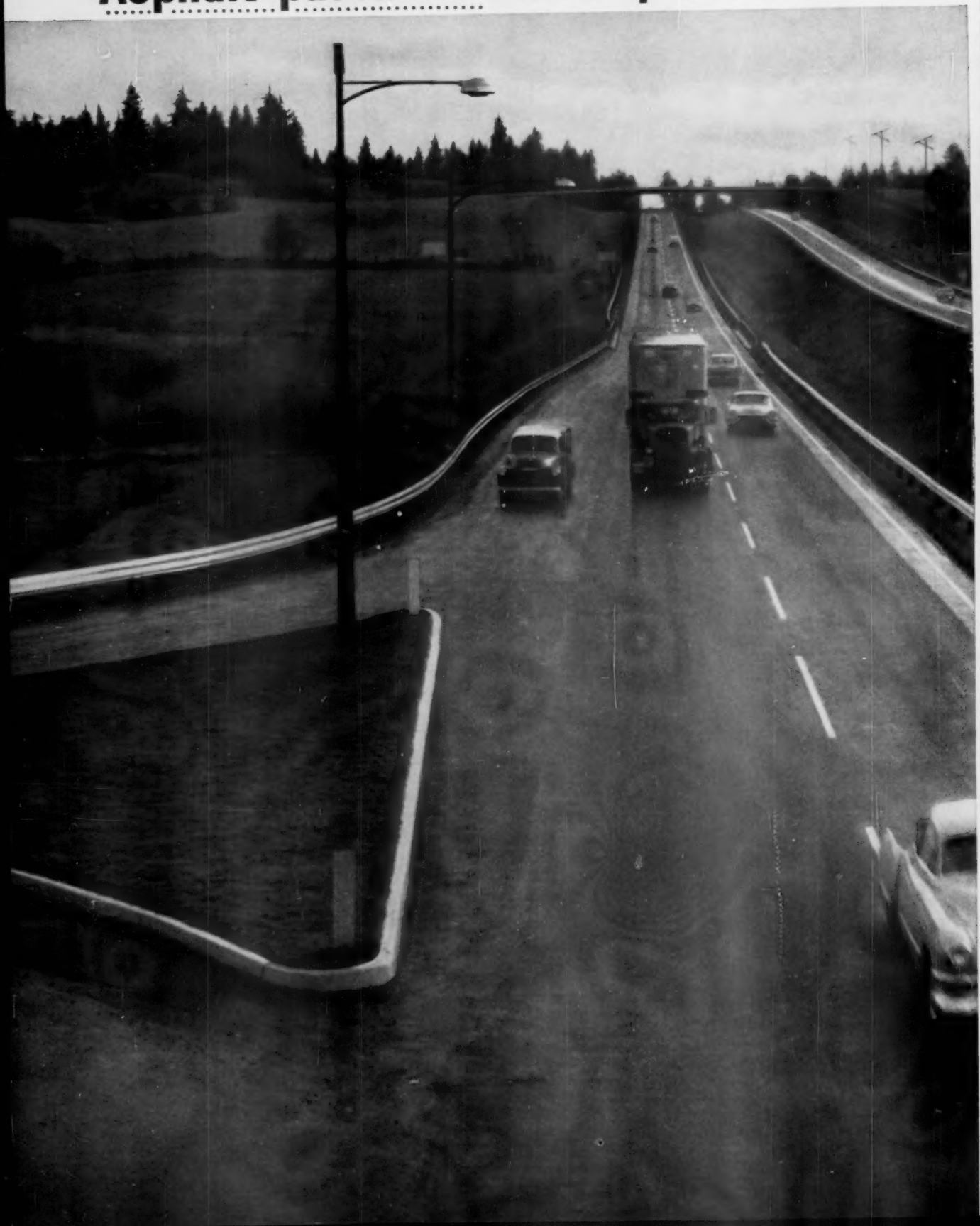

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(Circle 1 on Inside Back Cover)

Letters to the Editor

College Credits . . .

Dear Editor:

The article "The European Engineer and His Education" in the June issue was very interesting. Though Austria was not especially mentioned, the engineering education there is very similar to that in Germany, especially in leading institutions such as the Technical University (Technische Hochschule) in Vienna from which I graduated.

It should be of interest to Americans who are used to our system of *college credits* to make a comparison of courses on a collegiate level by translating European University studies into credit hours. I did this, I believe, some time in 1944, when I applied for a professional engineering license in the state of Ohio. (The Ohio State Board desired to obtain an outline of my college studies.)

While going through my records for this purpose, I noticed that many courses taught at engineering college level here had been taught in technical *preparatory high-school* in Austria. In many cases, the course contents were far beyond what is normally taught here to engineering freshmen and sophomores. The pre-university trigonometry course for example contained every bit of the material that can be found in Kells, Kern and Blend, *Plane and Spherical Trigonometry;* the Physics course all that is in Hausmann-Slack's book. There was one full year each devoted to inorganic and organic chemistry. Mathematics went right through plane and solid analytical geometry and elementary calculus. There were four semesters of descriptive geometry and a considerable amount of foreign languages and humanities. There was no repetition of any of this material later at the University level.

Mr. McCrensky's article mentions the fact that successful completion of preparatory high-schools for universities are automatically good for two years of college credits in this country. He also mentions that the reverse is also true and that admission to most European universities is granted to American high-school graduates only if they have an additional two years of college education. (It is interesting to note, by the way, that the latter is automatically true only for minor European universities, while leading universities, even under those circumstances, usually admit Americans only as auditors.) The description of prerequisite studies given above should give us a good idea why this is so.

A comparison of total credits, therefore, must, obviously, start out with about sixty credit hours normally corresponding to two years of college. . . .

ERIC H. WANG, P.E.
Albuquerque, N. Mex.

Contrast . . .

Dear Editor:

I noted the letter signed I. E. Morris in the May number of the A.E. and in going through its lines found it most laudable that you decided to publish it. The writer, in discussing the much-contested question of whether engineers ought to be employed in the drawing office, has definitely "hit the nail on its head," as judged by the way he compares design with mere drawing work.

I certainly do not stay for an overproduction of professional engineers, as this would obviously be accompanied by a lowering of their social and economic standard. But as far as the above-mentioned question is concerned I would like to contrast for once the position of the engineer in the U.S.A. to the one of the engineer in Europe. Having had several years' practice in American as well as European industrial concerns of repute, I believe I may talk about the matter with some authority. I wish to mention from the start that in most European firms of any importance the drawing office is to-day generally supervised by an engineer, while formerly this post was mostly entrusted to some "glorified man" who was chosen from the rank and file of draftsmen. The change in this direction came about in the depression years of the thirties, when many an engineer was glad to find a place to work somewhere in a drawing office. Many of them stayed there, not to work for a lifetime at the drawing board, but to assume after some time a supervisory position in that department. They were for the greater part men who had a natural bent for graphical work, and also proved to be more competent as liaison men between the drawing office and the design department than the "glorified draftsman." But what is most noteworthy: these posts are always well paid.

At all institutes of technology of Western Europe an engineer is required to acquire a good deal of facility in drawing work, without he, on the other hand, being deficient in mathematical accomplishment. Obviously a man having just come out of college will have to spend some time at the drawing board, as he must finally familiarize himself with the way the work is efficiently organized in this department. Many a European engineer finds himself now-a-days "quite happy" in the drawing office and it would be regarded as sheer snobbishness if any one would despise the work that is being done there.

GIORGIO G. MULLER, P.E.
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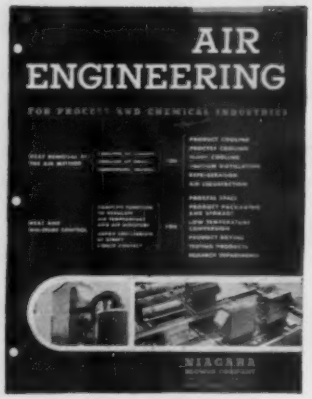

Write for this Bulletin No. 135

Write for Bulletin 135

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(Circle 2 on Inside Back Cover)

American Engineer

SEPTEMBER

1958

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History has shown time and time again that we have arrived at catastrophe by our failure to respond to events before they have become perilous cries.
—Gen. Omar N. Bradley

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PROFESSIONAL NEWS IN CAPSULE FORM

A Roundup of Late Events for Professional Engineers

Standards Engineers Society Plans Meeting

"Standardization, A Must for the Space Age" will be the theme of the seventh annual meeting of the Standards Engineers Society.

Norman L. Mochel, past president, American Society for Testing Materials and manager, metallurgical engineering, Westinghouse Electric Corp., Philadelphia, will highlight the three-day program as speaker at the annual banquet on Tuesday night, September 23.

Roger E. Gay, past president of the American Standards Association and Fellow of the Standards Engineers Society, will be the featured speaker at the Awards Luncheon on Wednesday noon, September 24.

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S. S. Attwood Appointed Engineer Dean at Michigan

Appointment of Stephen S. Attwood as dean of The University of Michigan College of Engineering has been announced.

Dean Attwood served as acting dean of the college since July 1, 1957, following the death of Dean George Granger Brown. In addition to his appointment, the Regents also gave approval to recommendations that the new dean be authorized to proceed with plans to appoint one or more associate deans in addition to the present staff to assist in the administration of the college.

△ △ △

Taylor New President Of Engineering Society

George J. Taylor, of New York, vice president of Day-Brite Lighting, Inc., will be president of the Illuminating Engineering Society for a one-year term beginning October 1, it has been announced.

Mr. Taylor, an NSPE member, was elected to succeed Kirk M. Reid, senior illuminating engineer of the General Electric Co., Cleveland, in a mail ballot of the 9,000-member organization composed of U. S. and Canadian lighting engineers, designers, and related lighting specialists.

NACE Schedules Sessions At New Orleans in Oct.

Approximately twenty-four technical papers will be presented in four symposia during the technical program at the New Orleans meeting of National Association of Corrosion Engineers, October 20-24. It will be the twelfth annual meeting of the NACE South Central Region.

One symposium, on oil and gas production, will hold two sessions. Other symposia are on offshore corrosion, corrosion of pipe lines and corrosion in the refinery and chemical process industries.

In addition to hearing technical papers in symposia, corrosion engineers will discuss their problems in more than twenty technical committee meetings. Most committees are composed of engineers from the petroleum and petro-chemical industries in this part of the nation. However, preventive methods which are of a general nature, protective coating and cathodic protection, also will be discussed.

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Library Named in Honor Of John Earl Frazier

The Pennsylvania State University Chapter of Keramos (the National Scholastic Honorary Fraternity of Ceramic Engineering) has named its new library being created in the Department of Ceramic Technology, College of Mineral Industries, the Frazier-Keramos Library in honor of one of its members, John Earl Frazier, of Washington, Pa., who was chairman of the Scholarship Committee of that department of the University from 1954 to 1958. Mr. Frazier now serves on the Committee as a member and as vice chairman.

Dr. G. W. Brindley is head of the Department of Ceramic Technology and Dr. D. R. Mitchell is acting dean of the College of Mineral Industries of Pennsylvania State University.

Mr. Frazier is a charter member of the Washington County Chapter, Pennsylvania SPE. He is president of Frazier-Simplex, Inc., Washington, Pa.

ASCE Nominates Friel For 1959 Presidency

Francis S. Friel, of Philadelphia, has been named the official nominee for president of the American Society of Civil Engineers for 1959 by the Society's board of direction.

Election will be by mail ballot of the 41,000-member Society and results will be announced at the October meeting of the organization in New York City.

Mr. Friel has been vice president of the Society since 1956, representing Zone II, which covers the Southeastern section of the United States. He served as director from 1950-53.

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1958 National Power Conference in Boston

Economical power generation in high fuel cost areas will be the theme of the 1958 National Power Conference, September 29-October 1, in Boston. The conference is sponsored by the American Institute of Electrical Engineers and the American Society of Mechanical Engineers. Fifteen New England colleges and The Electric Council of New England are cooperating in the conference.

The three-day parley will feature nineteen technical papers and five plant trips. Past and present leaders of both sponsoring societies are scheduled to attend. James N. Landis, president of ASME, will address a luncheon on Monday and Walter F. Barrett, past president of AIEE will be the guest speaker at the Wednesday luncheon.

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Harold A. Bolz Named Dean at Ohio State

Promotion of Harold A. Bolz to dean of Ohio State University's College of Engineering has been approved by the University's Board of Trustees.

Associate dean of the engineering college since joining the Ohio State staff in 1954, Mr. Bolz was named acting dean last March when Gordon B. Carson, former head of the college, was made the University's vice president, business and finance.

Dean Bolz also was given the title of director of the Engineering Experiment Station and retains a professorship in the department of mechanical engineering.

Both Messrs. Bolz and Carson are NSPE members.

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(Circle 5 on Inside Back Cover)

NSF Announces Soviet Journals Now Available

Approximately 60,000 pages a year of key Soviet scientific and technical journals are now available in English translation to United States scientists and engineers, the National Science Foundation has announced. In releasing a compilation of translated Russian journals, the Foundation indicated that there are now in print fifty-three English editions of Russian journals, four extensive series of translated Russian abstracts of scientific papers, and four series of partial translations of important Russian journals.

Support of these translations is provided by Government agencies—the National Science Foundation, the National Institutes of Health, the Office of Naval Research, and the Atomic Energy Commission (the latter two working through the National Science Foundation)—and by six commercial translating and publishing firms working without Government funds.

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Societies Announce Meeting Changes

Announcing a major change in policy, The American Society of Mechanical Engineers and the American Rocket Society announced recently that in the future their major national meetings will be held independently of each other.

The announcement of the independent meetings, issued jointly by the two societies, indicated that the decision to hold separate meetings was dictated primarily by the expanding size of the technical sessions and limited hotel space available. A second reason assigned was the "increasingly independent status of the field of rocketry and the concurrent growth of ARS from a small group to one of substantial stature in the technical field."

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(Circle 6 on Inside Back Cover)

National Survey Reveals Feelings of Engineers

Engineers would rather do engineering work, but feel there are more rewards to be gained by moving into jobs outside their technical specialization. This is one of the findings of a national survey of 1500 engineers by Deutsch and Shea, Inc., New York City, technical manpower consultants.

More than eighty per cent of the engineers responding to the survey felt that the greatest opportunities for advancement were outside of technical specialization. Sixty-five per cent believed that administrative work offered greater opportunities, and seventeen per cent felt that more opportunities were available in the sales field. However, in answer to a second question, only forty-two per cent of these engineers said they would be interested in leaving technical work if the salaries and opportunities in engineering were equal to those in administration and sales.

Why did engineers in the sample choose their present jobs? Reasons listed ranged from type of work to opportunity to travel. The six factors which exerted the most influence were: Type of work 45 per cent; Salary 34 per cent; Location 31 per cent; Advancement opportunities 30 per cent; Challenge to abilities 17 per cent, and Reputation and Prestige of company 14 per cent.

Of the 894 married engineers who participated in the survey, eighty-two per cent consulted their wives about accepting the jobs they now hold. Only sixteen per cent of the married engineers reported that their wives' opinions had little to do with the final decision.

Apparently a good many engineers are of a mind with Horace Greeley about the advantages of the West. Those in the sample ranked the Mountain and Pacific states highest as areas in which they would prefer to live and work. Among U. S. cities, San Francisco and Denver were mentioned most often by engineers as places they would prefer. More than half of the respondents living in the Middle Atlantic states would prefer to work elsewhere.

Dr. Mervin J. Kelly to Get John Fritz Medal

Dr. Mervin J. Kelly, president of Bell Telephone Laboratories, will be the 1959 recipient of the John Fritz Medal, it has been announced by the John Fritz Medal Board of Award representing four major national engineering societies.

Cited for "his achievements in electronics, leadership of a great industrial research laboratory, and contributions to the defense of the country through science and technology," Dr. Kelly will receive the award at ceremonies to be scheduled by the American Institute of Electrical Engineers of which he is a Fellow.

The John Fritz Medal is sponsored jointly by the American Society of Civil Engineers, the American Institute of Mining, Metallurgical and Petroleum Engineers, The American Society of Mechanical Engineers and the American Institute of Electrical Engineers. Presented not more than once in any year for "scientific or industrial achievement" in any field of pure or applied science, it was established in 1902 as a memorial to the great engineer and steel maker whose name it bears.

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Harry G. Hanson Promoted at PHS

Harry G. Hanson, director of the Public Health Service's Taft Sanitary Engineering Center in Cincinnati, Ohio, has recently been promoted to assistant surgeon general. He has been director of the Taft Center since its formation in 1954.

An NSPE member, Mr. Taft has been a commissioned officer of PHS since 1942.

SEPTEMBER MEETINGS OF NOTE

American Institute of Electrical Engineers and National Electrical Manufacturers Association—National Conference on the Application of Electrical Insulation, September 3-5, Pick-Carter and Statler-Hilton Hotels, Cleveland, Ohio.

American Chemical Society—National Meeting, September 7-12, Chicago, Illinois.

Instrument Society of America—Annual Instrument-Automation Conference and Exhibit, September 14-19, Convention Hall, Philadelphia, Pennsylvania.

Producers' Council, Inc.—Annual Meeting and Chapter Presidents' Conference, September 17-19, Du-pont Plaza Hotel, Miami, Florida.

Association of Iron and Steel Engineers—Annual Convention and Iron and Steel Exposition, September 23-26, Cleveland Public Auditorium, Cleveland, Ohio.

1959 Nuclear Congress Scheduled For Cleveland, Ohio, April 5-9

The 1959 Nuclear Congress, described as "the year's most comprehensive meeting devoted to peaceful uses of atomic energy," will be held at Cleveland, Ohio, April 5-9, it has been announced by the Engineers Joint Council.

The four component sections of the Congress will appeal to engineers, scientists, industrial executives, researchers and manufacturers and users of peacetime nuclear devices.

To be held at the Cleveland Auditorium, the Congress will be sponsored by over thirty leading engineering, scientific and management groups. Designed to gather and make available the latest information in dozens of fields of nuclear specialization, the Congress will be open to any interested persons from the United States or abroad.

Theme of the Congress will be "For Mankind's Progess."

Major parts of the Congress include the Nuclear Engineering and Science Conference, at which over 150 papers will be presented covering such fields as reactor design, disposal of radioactive wastes, radiation shielding and instrumentation. The Seventh Atomic Energy in Management Conference will outline new developments of importance to industry and their impact on executive decisions.

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Col. Hugh M. Arnold Leaves Canal Zone For New Position in North Carolina

With four years of engineering in the Canal Zone behind him—the last of these in the Canal Zone's No. 2 position —Georgia-born Col. Hugh M. Arnold recently left the Isthmus for his new post as commanding officer of the 20th Engineer Brigade at Fort Bragg, North Carolina.

Col. Arnold, an NSPE member, was appointed lieutenant governor of the Canal Zone and vice president of the Panama Canal Company in July, 1957, after he had completed a three-year assignment as director of the Company's Engineering and Construction Bureau, the unit which is in charge of all maintenance and construction projects in the civilian communities of this 50- by 10-mile stretch of the tropics.

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"Innovation" Needed in Industry Linville States at AIEE meeting

Leadership in industry "can be achieved only by introducing innovation" and innovation is dependent upon the carrying on of research, the pacific general meeting of American Institute of Electrical Engineers was told recently.

Presenting a paper at a session on management and research, Thomas M. Linville, operations manager at the General Electric Co., Schenectady, N. Y., said:

"Markets will control wages and prices to such an extent that the greatest leverage lies in leadership. This may be introduced in any or all functions of the business, but it is especially powerful when directed to product leadership. Here research is a tremendous asset. The sequel to research is invention, and the sequel to invention is opportunity for leadership and better profits. For those who aspire to leadership, then, research belongs in industry."

Mr. Linville, an NSPE member, defined the functions of industrial research as the determining of key areas of science to unlock new business opportunities, the analysis of scientific progress and the likelihood of breakthroughs in key areas, the accomplishment of research in key areas and the feeding of new knowledge and invention to business operation.

Review of Structural Engineering Developments Features ASCE Session

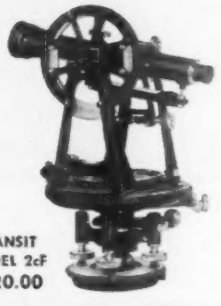
An international review of structural engineering developments will feature the national convention of the American Society of Civil Engineers in New York City, October 13-17.

The convention will provide a setting for a joint meeting of ASCE's Structural, Engineering Mechanics and Construction Divisions and the International Association for Bridge and Structural Engineering, at which the most recent advances in structural design, research in the behavior of structures and properties of materials, and construction techniques will be discussed in eight half-day sessions.

Thirteen European engineers, representing eight countries, and fourteen American engineers will be on the program, which has been arranged to give a well-rounded picture of recent advances and probable future trends in structural engineering, as well as presenting the most advanced current research and practice.

Special attention is given in the program to current trends in design of both steel and concrete structures. The plastic method of design of steel structures will be discussed in several papers, and reports on investigations of the effect of ductility, creep and fatigue will be given. Other papers are concerned with problems of stability, the design and performance of suspension bridges, fire protection, and fabrication and erection problems.

All the European and many of the American speakers are members of the International Association for Bridge and Structural Engineering, which promotes collaboration between scientists and engineers of different countries and provides a means for the exchange of ideas, theoretical and practical knowledge, and the results of research.



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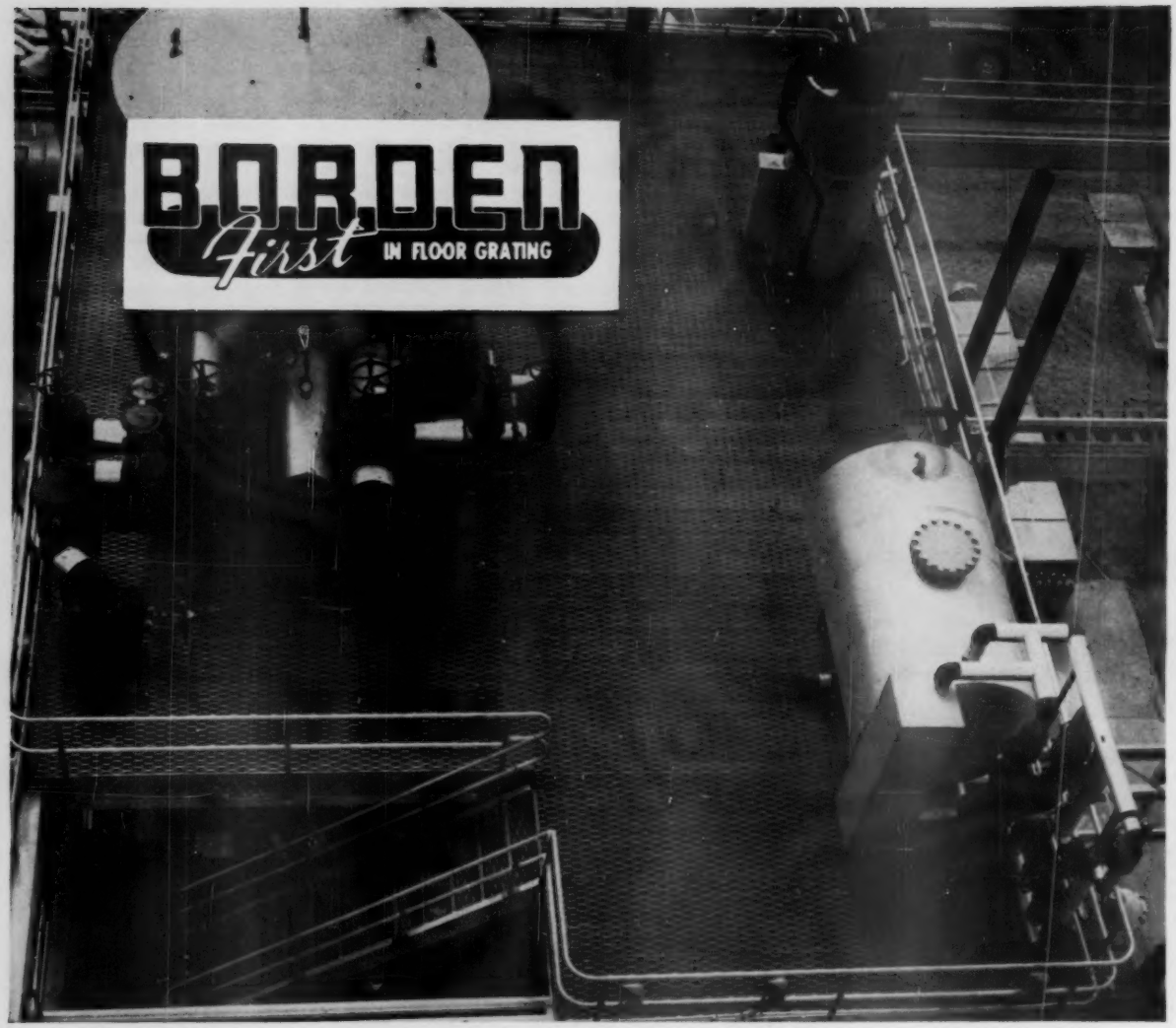

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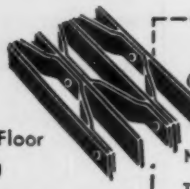

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The Magazine of the Registered Professional Engineer

VOLUME TWENTY-EIGHT NUMBER 9

The Russians were eager for the opinions of the touring American engineers regarding the Soviet reinforced and prestressed concrete industry. Left to right are: David P. Billington, Roberts and Schaefer Co., New York City; Walter H. Price, chief, Engineering Laboratories, Bureau of Reclamation, Denver; Ben C. Gerwick, Jr., president, Ben C. Gerwick Co., San Francisco; Professor T. Y. Lin, University of California (Berkeley); the author, and a Soviet official.

U. S. Engineers View Soviet Construction

By

James D. Piper, P. E.

Vice President for Promotion
Portland Cement Association

MR. KRUSHCHEV has repeatedly challenged the West to a duel to the finish between his system and ours—a contest not of arms but of economics and technology.

During my recent trip to the Soviet Union, the whole of Soviet construction—including research, design, production of building units, and actual construction work—seemed accelerated. The Russians mean business in their technological warfare. Their engineering projects are viewed by the Government as high priority.

Yet, their planned technology—with the emphasis on collective rather than individual needs—most assuredly has its weakness. Their system, at present at least, is not producing products of as high a quality as those emerging from the competition among American manufacturers.

Last year at the time of the International Prestressed Concrete Congress held in San Francisco, contact was made with the Soviet delegation of engineers to that Congress. At that time they promised their American hosts an invitation to inspect the Soviet building industry. True to their word, they extended an invitation early this year.

An American engineering delegation was formed to inspect the prestressed-precast concrete industry of the Soviet Union. It included: Professor T. Y. Lin, University of California, delegation chairman; Walter H. Price, chief of the Engineering Laboratories, Bureau of Reclamation, Denver, and past president of the American Concrete Institute; Ben C. Gerwick, Jr., of San Francisco, contractor and president of the Prestressed Concrete Institute; Professor Boris Bressler of the University of California (who speaks fluent Russian); David P. Billington, Roberts & Schafer Co., New York City, and the writer.

On May 10, 1958, we were flown from Berlin to Moscow in a Russian plane. Although the senior Soviet engineers, who were reciprocating for their American tour, set up our trip, their invitation was officially extended through the Academy of Construction and Architecture. This Academy has no counterpart in the United States. It does forty per cent of all engineering and scientific work in the building construction field and coordinates the sixty per cent done by other agencies in the USSR. The State Committee on Construction is the only higher authority on construction than the Academy, and the president of the Academy is one of its principal members.

The Academy is composed of ninety members and 150 associate members. It is governed by a presidium of seven including a president and two vice presidents and employs 8,000 engineers, scientists and technicians in the twenty-two institutes under its direction. These institutes cover all phases of construction including planning and construction of whole towns and regions, housing, and industrial, agricultural and public buildings. They supervise research and design on all types of structures; produce building materials; and plan organization, mechanization and technical aid to construction. Certain institutes are also concerned with structural economics, theory and history of architecture and structural engineering; others with scientific information on building and architecture; and still others with research on water supply, sewage, hydrotechnical structures and hydrogeology.

Because of the prestige of the Academy in Russian affairs, we were able to get a surprisingly broad picture of construction activities in the USSR in just ten days' time.

THE institutes of main concern to our group were The Research Institute of Concrete and Reinforced Concrete and The Central Institute of Structures. These two Institutes of the Academy are primarily concerned with research work on building construction materials and methods and are housed together on the same grounds in Moscow. They are situated on a campus of thirty to forty acres which houses six major laboratory buildings, each in the neighborhood of 30,000 square feet. The general area is unattractive, and the approach by road is through slum areas over unpaved roads. None of these buildings appeared to be very new, although this fact is hard to judge since new buildings pointed out to us also looked old.

The delegation of American engineers toured the laboratories operated by the Research Institute of Concrete and Reinforced Concrete and the Central Institute of Structures. Both these Institutes are housed on the same grounds in Moscow.

There is a great emphasis in Russian construction on the standardization of building units which leads to the sacrifice of esthetic values for practicality. All projected construction plans are based on conversion from precast reinforced concrete to prestressed concrete.

We were received there by the institute directors and their staffs. This pattern of reception by the top officials was consistent throughout our entire inspection tour. We were asked for comments and questions. Members of the press took notes on whatever we said and took photos of our tour. They continued to do this throughout our visit.

I was impressed by the great amount of activity evident in the various laboratory buildings. Work areas seemed to be crowded with various types of testing machines closely spaced and all in operation. My initial reaction was that they were putting on a show for our benefit, but after careful observation and discreet inquiry, I found that this was not the case. These laboratories operate on a three shift-round-the-clock basis and time on all the test equipment is scheduled months in advance.

The labs employ more than 600 engineers, scientists and technicians. It seemed to me that they make greater use of technicians than we do, thus freeing their engineers to supervise the work of several groups. All the work I observed there would be classified in my organization as development rather than research. The Central Institute of Structures covers all types of building materials. We learned that almost all research work being done was related to precast or prestressed concrete. For instance, the work being done on metals had to do with the welding of reinforcing steel and connections of precast units. In the area of clay products, the only work I observed was in connection with ceramic facings for precast concrete wall panels. I was surprised at the extent of large and full-scale testing. We saw several tests involving concrete members 100 feet long.

The work in progress at these laboratories is too extensive to cover in detail. On any project in which we expressed interest, we were given on-the-spot information and later were provided technical bulletins, written in Russian, covering the project in question. In the over-all tour, we collected more than 300 pounds of such bulletins.

We visited the Moscow Project Institute which has responsibility and control of all building in Moscow. Its sixteenth district offices throughout the city operate as independent design and construction units under direct supervision of the central office. The Institute employs 3,100 technical people distributed about equally among four classifications: structural engineers, architects, sanitary engineers and technicians. It sets standards for all construction in Moscow and has succeeded in standardizing eighty-five per cent of all construction in the city. One reason for this is that the Institute prepares a catalog of available precast and prestressed concrete structural units that are to be used in all standard construction. The catalog

we were given covers nine types of precast concrete foundation units and a similar number of beams, columns, floors, stairways and roof units.

There is almost no industrial construction planned for the Moscow area; construction projects we saw there were related to either public buildings or housing. This year, the Institute will have 24.6 million square feet of area in apartments and schools under construction. About 2.6 million cubic yards of concrete will be used for these projects.

Over fifty per cent of the Moscow Project Institute's work is in housing. On housing projects they do not prepare complete cost estimates, but instead relate costs to cost per square meter of living space. In estimating cost for apartment living areas, however, they only consider living rooms and bedrooms and disregard kitchens, baths and halls. On this basis they calculate the typical housing construction cost at about ninety-three rubles ($23.25)* per square foot of living space.

WE were shown designs of typical 5-story and 8-story apartment houses and told that they are now only designing the 5-story buildings for reasons of economy. This is probably because in this type of structure they can eliminate elevators.

In touring the Institute offices, I noted that their drafting rooms were filled to capacity with tables. I was told that more than half of their drafting employes were women.

Later in the tour, we visited a design institute in Leningrad. About ten per cent of its work is in Leningrad, and the rest of it is scattered all over the Soviet Union and even outside in Communist China and such satellite countries as Czechoslovakia, Poland and Hungary. Major examples of its design work are the Leningradski Hotel where we stayed in Moscow and the Volga Canal.

Among various other types of design work carried out by this Institute are: shipyards, hydroelectric stations, dock sluices, hangars, repair shops, factories, and metallurgical buildings. Many of these projects have to be individually designed, but the Institute also does much standard designing. While there, we met about twenty-five leading Soviet engineers who asked extensive questions. Some of these were: what types of space structures are used in America?; what concrete shell designs do you employ?; why is the percentage of prestressed concrete to reinforced concrete so low in America?, and what is the comparison between the use of prestressed concrete and steel in your country?

This Institute employs 650 engineers and technicians and has an operating budget of about twenty million rubles ($5 million) per year. This amounts to only one and one-half per cent of the cost of the projects it turns out annually (approximately 1.3 billion rubles or $335 million).

Scattered through our itinerary were inspection tours of precasting and prestressing factories in both Moscow and Leningrad. Factory No. 4 in Moscow produces precast-prestressed concrete floor and roof slabs. The capacity of this plant is 163,492 cubic yards of concrete per year of which 65,397 cubic yards is currently prestressed concrete. By the end of the year, this factory will have converted to 100 per cent prestressed concrete which they consider to be more economical.

Material movement is handled by overhead cranes. There is no assembly line technique. Forms are steel; reinforcing cages are cut and welded together on the spot. Wire fabric which would be shipped as standard made-up units in the United States is fabricated in sheets at the factory. This plant annually produces 600,000 square yards of cored floor and channeled roof slabs at the rate of 240 pieces per day.

Cement for this Moscow factory is shipped by rail from a plant sixty-three miles distant. Aggregates are shipped from their source ninety miles away. Four hundred workers are employed there on three eight-hour shifts, six days a week. The selling price of concrete units they produce is 200 rubles ($50) per cubic meter. About seventy per cent of this money goes for plant operating costs and the balance is used to finance technical investigations and to increase state profit.

The six major laboratories of the Research Institute of Concrete and Reinforced Concrete were found by the author to be working round-the-clock and their test machines scheduled months in advance. He also noted an extensive use of Soviet women workers in all levels of the construction industry. Most mothers work since the state provides nurseries and kindergartens for their children.

Factory No. 6 in Moscow was built in 1956 and makes the same products as Factory No. 4. Sixty engineers and five hundred workers are employed there on the same three-shift basis. This plant is also converting to prestressed concrete and officials stated that the change will save 6,614 tons of steel each year.

In Leningrad, we inspected a completely new precast-prestressed concrete plant which was the most modern of any we saw. It was constructed specifically for the production of prestressed concrete building units and the entire building as well as structures within the plant were made of the units being produced there. The handling of products was as modern as anything I had ever seen. It reminded me of automobile assembly techniques used in Detroit. We learned the average worker there received 1,000 rubles a month ($250).

OUTSIDE Leningrad in Avtovo, we saw the actual construction of a precasting factory. The plant is being con-

* Based on a 4 ruble-to-1 dollar official rate of exchange effective in the USSR during May, 1958.

On the inspection tour of laboratories, factories and housing projects, Russian engineers answered on-the-spot questions of the delegation and later provided technical bulletins covering the specific project in question.

verted from a previous use and plant areas are being expanded by lifting enormous concrete building units into place. For example, the builders covered a space of 131x262 feet between two existing structures by constructing precast concrete shells at ground level and then lifting them into final position. The average thickness of the shells was 3.6 feet. Each contained 288 cubic yards of concrete. The over-all shell weight totaled 560 tons. This factory has been given much publicity behind the Iron Curtain and a model of it is on display at the Brussels World's Fair.

Another outstanding construction project we were able to observe was the new combination auto and rapid transit Metro bridge which will span the Moscow River just east of Moscow University. It is to be a double-deck, all-concrete bridge 3,937 feet in length that will provide direct service to the University and the large residential areas being developed south and east of the University. The top deck will carry a double roadway and the bottom deck will contain the Metro line. A train station will be located in the middle of the bridge.

All members of our delegation were, of course, interested in the living conditions of the Russian people and our tour of housing areas gave us an indication.

On the southern outskirts of Moscow we were shown a group of sixteen apartment buildings, each five stories high and containing in all 1,000 new apartment units. A typical apartment included a 10x18-foot living room, two 10-foot square bedrooms and a small hall, bath and kitchen. The kitchens had stoves but no refrigerators. Total construction cost of the development was claimed to be 3.9 million rubles ($975,000). Housing officials stated that in this development, land cost nothing since the state owns everything. It is planned that an apartment there will cost tenants $12.50 a month plus another $10 monthly for utilities.

All of these apartments were built of precast concrete panels. While touring them, we saw some apartments being plastered by women laborers. The workmanship was crude by our standards.

We saw a similar but much larger project in the Neusky district of Leningrad. It is designed to include 22,000 apartments, 12 schools, 40 kindergartens and nursery schools, 4 movie theaters including 1 cinerama, and 3 swimming pools.

Our most formal exchange of ideas and facts with Russian engineers took place in a conference at the Academy of Construction and Architecture. Among those present were: Mr. Betkin, president of the Academy, leading scientists and engineers in the construction field, university professors, and members of the press. The question of the exchanges between the USA and the USSR on soil physics was discussed and we also covered the functions of some of the institutes under the Academy.

When we inquired about their policy toward research, we were told that Soviet researchers are free to work on any projects they wish. This statement was later amended with the qualification that researchers must, of course, fit their work to over-all goals. They also added that under the Academy's new policy no research project is considered completed until its results have been put into actual practice.

We were told with emphasis that the president of the Academy is also deputy president of the State Committee on Construction. This they felt would show us how high the Academy was placed in the government and how well its work is financed. At the end, Mr. Betkin showed us a book on individual house construction, a sort of do-it-yourself guide. It, like all their engineering publications, had to be cleared by the appropriate institutes before publication.

Our delegation presented a number of talks on American practices. Professor Bressler delivered his entire report in Russian and others opened their introductory remarks in Russian. This courtesy was much appreciated by our hosts. We left them a movie on the Lake Pontchartrain Bridge in New Orleans. Later, we learned that Mr. Khrushchev, an engineer himself, had a private showing of the film and was quite impressed with it.

ON our last full day in Russia, May 20, we had a meeting with V. A. Kucherenko, chairman of the State Committee on Construction plus top Academy officials. Mr. Kucher-

(Continued on page 49)

About the Author . . .

Mr. Piper

James D. Piper, vice president for promotion, joined the Portland Cement Association in 1937 as a structural engineer in its Oklahoma City office. He served as structural engineer in the Austin, Texas, office of the Association from 1939 to 1942, when he entered the U. S. Naval Civil Engineer Corps (Seabees). Following thirty months' duty in the South Pacific during which he rose to the rank of lieutenant commander, he returned to the PCA in 1945 as a structural field engineer with headquarters in Houston. In 1946, Mr. Piper was appointed District Highway Engineer in the Association's Dallas office. He became District Engineer for Texas in 1949. On February 1, 1955, Mr. Piper was appointed to his present position, in which he supervises promotion activities of the Association throughout the country, including the work of the Association's thirty-two district offices serving forty-six states, the District of Columbia and British Columbia.

Mr. Piper was graduated from Oklahoma Agricultural and Mechanical College, with a Bachelor of Science degree in architectural engineering. He studied and was a graduate assistant in the Civil Engineering Graduate School at the University of Illinois. Mr. Piper is a registered professional engineer and licensed architect in Texas, and a licensed civil engineer in Oklahoma.

FROM WASHINGTON

BY
MILTON F. LUNCH,
N.S.P.E.'s Legislative Counsel

SCHOLARSHIPS DEFEATED IN FEDERAL AID TO EDUCATION LEGISLATION

ELEVEN months ago the Russians launched Sputnik I and thereby created a political-economic-technological turmoil which will have its effects for many years to come. Not the least of the immediate repercussions was an emotionally-charged feeling that American education had failed, particularly in the quantitative aspects of degree-bearing engineers and scientists. From this atmosphere there arose a hue and cry for a massive Federal education program, stressing scholarships as the solution to the Russian challenge.

Fortunately, the American legislative system is a a deliberate process, the relative slowness of which often irks those with a sense of urgent mission. There is little doubt that a huge Federal scholarship program would have been voted in the Fall of 1957 if the legislative machinery was geared for high speed. Now, after extensive hearings, studies, deliberations and debate the scholarship approach to educational problems has been found wanting and Congress has discarded it. At this writing, Senate and House conferees have agreed upon a final version of a so-called "National Defense Education Act of 1958," which contains many important provisions and which will have widespread influence on the future of education, particularly in engineering and science. But the bill does not provide for any Federal scholarships and this issue was the crux of the analysis of the past eleven months. NSPE urged consistently that Congress not authorize undergraduate scholarships, contending that the solution required emphasis on quality, rather than quantity.

Why did Federal scholarships finally fail in the face of strong support for them from President Eisenhower, the chairman of the Senate Education Committee, the chairman of a special education group in the House and many leading members of Congress? Those who read the Senate and House debates on this question will find many reasons. To this observer, if one had to select a single overriding reason, it would be that most legislators felt an inherent repugnance to the idea of a child securing a college education at Federal expense on a "giveaway" basis, contrasted with the tradition and virtues of making one's own way through sacrifice, thrift and hard work. Typical of this feeling was the comment by Representative Judd of Minnesota who offered the successful motion on the House floor to strike the scholarship provisions in favor of loans: ". . . it is better for our society and for our country. It is in full accord with our American way of meeting our problems. . . . Any boy or girl who is not sufficiently competent to be able to pay back such a loan, and to want to pay it back so that others can also get loans from the fund, is not good enough to deserve a free scholarship." Despite the plea of Rep. Elliott of Alabama, the House sponsor of the bill, that scholarships were needed as an inducement to improved scholastic achievement generally, the Judd amendment carried 109 to 78. Prior to the vote, the backers of the Hill-Elliott bill had gradually reduced the number of scholarships requested from 40,000 to 23,000 to 10,000—the final number corresponding to the Administration's request.

When the bill went to the Senate floor, Senator Hill and his supporters were ready to settle for 10,000 Federal scholarships at $500 per year, plus an additional $500 grant if needed. But again the debate indicated a strong anti-free-education philosophy, leading to adoption of an amendment by Senator Cooper of Kentucky to provide for 20,000 Federal scholarships on the basis of only $250 a year in grants, with the student eligible for an additional $750 loan each year, repayable in ten years at two per cent interest. In view of the strong House sentiment against scholarships and the weakness of the Senate scholarship provision, the conferees abandoned all scholarship provisions in favor of a loan program.

As agreed to by the conferees, following are the major provisions of the education bill, in summary:

LOANS—Available to college students regardless of field of study, but special consideration shall be given to students with superior academic background who express a desire to teach in elementary or secondary schools or have a superior capacity or preparation in science, mathematics, engineering or a modern foreign language. Loans, based on need, may not exceed $1,000 a year and are repayable in eleven

Rep. Elliot

Sen. Hill

Rep. Judd

Sen. Cooper

years after graduation at three per cent interest. Up to fifty per cent of the loan will be canceled for service as a full-time teacher in a public elementary or secondary school, at the rate of ten per cent for each year of teaching.

STRENGTHENING SCIENCE, MATHEMATICS AND LANGUAGE INSTRUCTION—$70 million a year for four years divided among the states for equipment and minor remodeling of laboratory space in public schools (loans available to private schools).

FELLOWSHIPS—1,000 fellowships the first year and 1,500 a year the following three years for graduate study (in any field) not in excess of three academic years. Fellows will receive $2,000 the first year, $2,200 the second year and $2,400 the third year, plus $400 a year for each dependent. NSPE's last-minute plea to the conferees to broaden the maximum period to five years so the fellow could spend some time in teaching was not adopted, even though the bill permits part-time employment in teaching.

AID TO COLLEGES—Institutions of higher learning may receive up to $2,500 a year for each fellow, to the extent that the grant to the institution is found to represent the cost of new or expanded graduate programs, attributable to the fellow. Worthy of note was the Senate's rejection of an amendment by Senator Morse of Oregon to provide a payment of $500 to each institution for each scholarship awardee in attendance at that school. In arguing for his amendment Senator Morse made a strong case that the most urgent problem in higher education was aid to the schools rather than scholarships, particularly in engineering and science, even though Senator Morse was one of the strongest backers of the scholarship provision.

GUIDANCE, COUNSELING AND TESTING—$15 million a year for four years for grants to the states to establish and maintain testing, guidance and counseling programs. The bill contemplates that this program will identify the brighter students and guide them into courses of study necessary for admission to college. Also, funds are provided for short-term institute sessions for guidance counselors. Those attending the institute sessions (mostly during the summer) will receive $75 per week and $15 per week for each dependent.

LANGUAGE DEVELOPMENT—Centers for the teaching of modern foreign languages will be established through contracts with the colleges. Stipends will be paid to individuals undergoing advanced training in a modern foreign language, based on a finding of national need. Language centers and research in language instruction are authorized.

USE OF TELEVISION, RADIO AND MOTION PICTURES—An Advisory Committee on New Educational Media is established to conduct and foster research on the use of modern media in the educational programs of public schools and colleges.

AREA VOCATIONAL EDUCATION PROGRAMS—An additional $15 million a year for four years to expand the present vocational education assistance programs is provided. There is considerable question, however, as to just how this money will be used because of the adoption of an amendment by Senator Bush of Connecticut which reads, as modified by the conferees: " . . . shall be used exclusively for the training of individuals designed to fit them for useful employment as highly skilled technicians in recognized occupations requiring scientific knowledge, as determined by the State board for such State, in fields necessary for the national defense." Senator Bush clearly wants the money used to educate engineering and scientific technicians through the state educational system. But other portions of the section would still authorize the use of funds for various vocational education programs. NSPE had called upon the conferees to delete the Bush amendment because of the serious damage it might do to engineering and scientific technician education by putting the states into that function, for which they are neither qualified nor experienced.

SCIENCE INFORMATION SERVICE—The National Science Foundation will establish a Science Information Service to index, abstract and translate scientific information, and develop programs to make such information more readily available. A Science Information Council will advise in this work.

This sketchy review of the major provisions of the bill will indicate that the over-all four year program of Federal aid to education leaves many questions and will create new problems. It is to be hoped that the Commissioner of Education will make wide use of his new authority to create advisory committees of twelve members each, including four members who are recognized scholars in engineering, mathematics or science. Although the legislation covers general education, throughout its development it was "sold" largely on the basis of the national defense as related to engineering and science. The extent to which it may aid or harm engineering and science will depend upon the wisdom with which it is administered.

Thinking Ahead in the Engineering Profession . . .

The Place of the Engineering Technician

By

G. ROSS HENNINGER, P.E.

Director, National Survey of Technical Institute Education, and President, Ohio Mechanics Institute

TODAY we have a problem. Now, problems are not novel in our daily life. And this particular problem actually is not new. It just sort of grew up suddenly on our blind side, and now, we are surprised—even startled to the point where our national wits tend to scatter a bit. Our problem is: "How best to provide the technically competent manpower which we need now and which we seem destined to need so acutely in the foreseeable future." The answer to this problem involves both a better educational pattern and a better manpower utilization pattern and philosophy. The answer to this problem not only directly affects the personal lives and welfare of all the people directly involved, but seems to be a critical factor in our national security and in our whole social and economic structure. So, it is indeed a problem of some moment. This problem is of direct significance and importance to the engineering profession. We are in it whether we like it or not.

Our national problem is represented in the much-publicized shortage of scientists and engineers. Regardless of such debates as we may hear or read involving the sematics or statistics of this situation, there is no dodging the fact that we do have shortages of adequate competencies in the right places. And this is a time of peace—or at least nothing worse than a "cold war" of nerves and technologies. We are just getting accustomed to universal travel by air with piston engines and turbines—with jets coming up—when we are confronted with the fantastic fact of spaceships actually in flight! And lest we tend to feel smug about the fact that these first space-flying technological creations of man cannot yet be fully controlled, we should remember that the Wright Brothers' first flying machine was no less uncontrollable. Less dramatic by comparison now, we have electronic ovens for our kitchens and electronic "brains" just beginning to be translated on a major scale from military purposes into business and industrial uses. Things such as these require human brains and adroitness in tremendous quantity, and of high quality.

And so, we find ourselves on the threshold of a highly technological era, and already "fresh out" of qualified manpower, on the basis of our habits of utilization. In spite of our "exploding population" not enough persons are being born daily to go through our traditional educational cycle and give us the quantity of engineers and scientists which we will need in everyday life on the

Here at one of National Carbon's development laboratories, a technician watches through an observation port in a flame-test chamber as a new graphite-base material is put through its paces.

basis of our present traditional methods of education and utilization.

Times do change, and we had better make an effort to change with them—change our sights or be engulfed.

Most of you readers know the history of engineering. The first engineering was for military purposes, followed by roads, bridges and aqueducts for the common people, and hence called "civil" engineering to distinguish it from the military. Then came mechanical, electrical, and the whole family of applied arts and sciences as the store of technical knowledge grew. All this you know, but how often do you *think* about it—ponder it—in the light of its sociological import and other comparisons of *today?* In those early days these men did not object to being called "electricians" or "mechanics." Even Charles Steinmetz, the "wizard" of early electrical science and education was mentioned in contemporary literature as an "electrician." In fact, what about our present engineering colleges? The land-grant college system, which includes such renowned engineering schools as MIT, etc., was set up as "colleges of agriculture and mechanic arts"—no mention of "engineering." However, as the fields expanded, there came a change. Professional consciousness took form, and the professional-technical societies were founded—partly for self-education, and partly for mutual prestige and promotion. Even in engineering education, you may recall that before the turn of the century the Society for the Promotion of Engineering Education was formed. Note the word "promotion." Even less than seventy years ago, engineering education itself was fighting for a niche of recognition and acknowledgment of respectability in the cloistered halls of traditional higher education in the classical sense.

EVEN in its maturing and more secure status, engineering education still has its hassle with the traditional "liberal arts." Experiments and debates continue as to how much time can be taken out of a four-year engineering curriculum for social-humanistic studies, economics, business administration, history and government, and other topics intrinsically valuable, and still at the end of four years have an individual with enough of the available welter of scientific and technical information to be legitimately called an "engineer." Thirty to fifty years ago the scope of available technological and scientific information was of such proportions that the traditional four-year engineering curricula had a fair chance to cover the ground reasonably well. With continuing expansion of technical knowledge and growing realization of the scope still to be learned or digested for later application, the engineering spectrum—educationally as well as professionally—must be re-evaluated and re-divided —for example as indicated in the recent ASEE *Grinter Report.*

I mentioned Steinmetz. Let us consider him again for a moment. I mentioned that he was referred to as an "electrician" even though he was an outstanding authority on electrical and related science. In a way he was typical of the old "seat-of-the-pants" school, like Kettering, Edison, Ford, the Wright Brothers, and many others, learning things by doing them; and then similarly teaching others. In those days such people were, initially at least, one-man "teams" insofar as engineering explorations were concerned. Even as they developed beyond the initial stages, the individual could do the handwork as well as the brain work required, with the aid of supporting craftsmen; Mr. Bell and Mr. Watson of telephone fame, for example. Thus, with minor over-simplification, we can say evolved the "two-man team" of engineer plus craftsman to accomplish an engineering project.

Manpower Relationships—The Engineering Team

Times change, however, and we are beginning to see that in our national habit of topsy-like growth, we have been trying to make-do with a 2-part "team" (the engineer plus the craftsman) beyond the ability of such a "team" to cope with the currently expanded—and ever expanding—technology of our daily life.

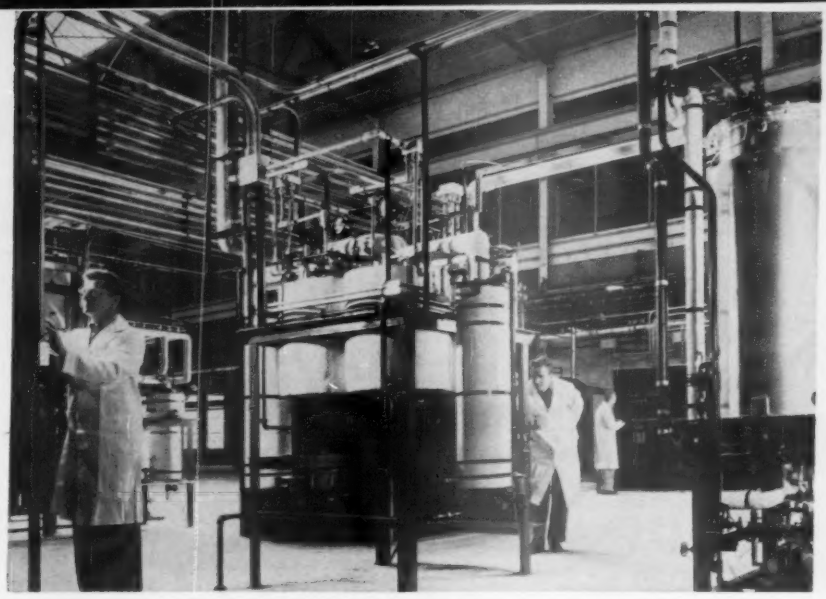
In the "2-man team" pattern, the engineer or scientist must take time to do for himself the many parts of his work which do not require or justify his time or talents. In many instances such work would be done even better by a competent aide such as is envisioned in the engineering technician. The time and effort of the engineer or scientist thus "salvaged" would directly enhance by the same amount his productive capacity and hence his earning power and personal satisfaction. This, incidentally would contribute substantially to a correction of the "shortage" of scientific-engineering manpower.

So, at long last, we are beginning to give serious national recognition to the need for a 3-man "team" (the engineer, *plus* the engineering technician, *plus* the craftsman) in the effective execution of an engineering project. We have been hearing quite a lot about this recently and NSPE has begun to exert some influence in this direction. This could be a major part of a lasting answer to our national question of adequate technical and scientific manpower.

To produce efficiently a 3-part "team" of satisfying effectiveness requires a 3-part educational program; (1) the university-collegiate program for engineers and scientists; (2) the technical-institute type of engineering program for engineering technicians, with counterpart programs in other technologies such as medical and dental, accounting, industrial production, secretarial science and others, and (3) vocational-trade programs for the craftsman.

This "team" idea, of course is not new. It was "discovered" and brought to public attention here in the

Drafting is typical of the wide array of semi-professional functions that may be performed by engineering technicians.



The technician is of great value in such fields of activity as the development of products. Here is the Lummus Company's new engineering development center at Newark, N. J.

United States about thirty years ago through national studies of engineering education and of technical institute education conducted by the American Society for Engineering Education. Perhaps I should say "rediscovered," because both the idea and this pattern of manpower coordination and utilization long had been the established pattern of the technically proficient nations of Europe. Europe was the seed-bed from which the idea was brought to the United States before the turn of the century. The idea "took," but in a scattered and desultory sort of manner, perhaps because the engineering profession itself was then struggling for recognition in the same general area of technological activity, sometimes called "applied science."

Before continuing, my approach to this matter is based upon two definitions. One of these definitions describes a person in terms of a job-description. This person represents a segment of the engineering-industrial-scientific manpower spectrum. His counterpart also is to be found in other professional and business fields where in many instances he has been accorded a status and recognition far beyond the over-cautious and preliminary beginnings of status and recognition to be found presently in the engineering-industrial field. This person is the engineering technician, and we define him thus:

The Engineering Technician

". . . Classified on the basis of educational certification, the engineering technician would be a graduate of a technical-institute type of curriculum as accredited by Engineers' Council for Professional Development, or recognized equivalent. Classified occupationally, the engineering technician performs semi-professional functions of an engineering or scientific nature, largely upon his own initiative and under only general supervision of a professional engineer or scientist; he assists, and supplements the work of, the engineer or scientist.

"Typical among the wide array of semi-professional functions performed by engineering and scientific technicians are: Drafting, design, and development of products and of engineering plant; installing and operating equipment, estimating costs, selling, and advising customers on the use of engineering or scientific equipment.

"In many instances, the technician may serve as a liaison between the engineer or scientist on the one hand, and the skilled craftsman or layman on the other hand. In carrying out these various activities, he may have group leadership responsibilities. The technician must be able to communicate mathematically, scientifically, and linguistically."

Now, in direct and intimate relationship with this person, we turn to a parallel definition. This one covers the formalized educational process designed to serve the person fitted to become an engineering technician.

In industrial lingo, we might say—the educational program is designed to "produce" engineering technicians from qualified and appropriately selected raw stock. We define such a program as "technical-institute education."

Technical Institute Education

"The term refers to the intermediate strata of technical curricula which in general are of two years duration (full-time) beyond the high school level. Curricula are technological in nature, and they differ in both content and purpose from those of the vocational school on the one hand, and from those of the engineering college on the other hand.

"Such curricula emphasize the understanding and practical application of basic principles of mathematics and science as they relate to a major technical specialty, *rather than* the acquisition of proficiency in manual skills. High school graduation is required for admission, and mathematics through algebra and geometry are prerequisite.

"The programs of instruction are similar in nature to, but briefer and more completely technical in content than, professional engineering curricula. The major purpose is to prepare individuals for a high degree of occupational proficiency in various technical positions or specialized areas of activity encompassed within the broad field of engineering enterprise."

The objective of these definitions is to contribute to a better understanding of the significant common interests and differences to be found in the somewhat troubled boundary area between the engineering technician and the skilled craftsman on the one hand, and between the engineering technician and the engineer on the other hand. These areas of relationship are of the utmost importance to the engineering profession in general, *and to NSPE in particular*. They present us with a challenge and an opportunity for leadership if we can but see it soon enough.

Relationships in Educational Spectrum

In considering the proper place of the technical-institute program in our national educational and professional spectrum, attention must be focused upon the fact that it is the engineering field which has "exploded." As engineering moves into the realms of science in contradistinction to the realms of application and operation in which engineering started and has grown, two facts stand out with increasing clarity.

One of these facts is that some adequate and integrated provision must be made to continue to supply the technically competent manpower required for this engineering application and operation, and required also to augment and to supplement the professional engineer and the scientist in research, design, development, and supervision. In any event, this manpower is an inseparable part of the over-all engineering manpower spectrum. In general effect, it is taking the place of "the engineer" as we have known him, as "the engineer" of today and of tomorrow increasingly takes his new place and becomes more and more devoted to the scientific problems and opportunities of the expanding technological universe. This manpower area is the professional area of the "engineering technician." The engineering profession cannot afford to ignore this.

THE second fact is that, for his optimum development, the engineering technician is best served by an educational program which is intimately related to, but which differs significantly from, the program most effective for the engineer, and which likewise differs significantly from the educational program most effective in developing and enhancing the skills and the "know-how" of the craftsman. In contrast with the engineer, the engineering technician does *not* need to have either the depth or the extent of mathematical or scientific understanding required by—and of—the engineer. However, the engineering technician *does* need to have a practical working understanding of essentially the same subject matter within his selected technology. He also needs appropriate communications skills. For uncompromised results, this requires an educational approach comparable in quality and general level to the university-collegiate engineering program, but differing significantly in that the emphasis required is that of practical application of established scientific principles rather than the derivation or extension of new scientific knowledge or techniques.

Further, in contrast with the craftsman and his highly commendable educational program of vocational-trade-skills and "know-how," the engineering technician does *not* benefit significantly from the development of proficiency in manual or related skills nor from technological subject matter taught from that angle. However, the engineering technician *does* need to have—or, at least can profit by having—a general working knowledge of the nature of manual skills related to his area of occupational and subject-matter interest. For uncompromised results, this requires an educational approach distinctly different from and of much more rigorously technical level than the skill-proficiency program effective for the craftsman and commonly represented in the vocational-trade or "vocational-technical" program with which we are all familiar. I may add in passing that this significant and necessary distinction is broadly overlooked in the efforts currently being made to obtain a Federal subsidy program of program-extension for so-called "area-vocational" schools.

The consensus among the regional committees of our survey all over the country is overwhelmingly to the effect that the technical-institute type of educational program, as defined and as currently needed, lies very much closer to the professional levels of engineering than to the trade-skills and technical craft level of the "vocational" program. Here, it should be clearly understood that this in no wise is a criticism of nor a reflection upon the "vocational" program—which in a great many instances is doing an excellent and valuable job in its appropriate field—but merely a statement of proper relationship. There is strong evidence that these critical distinctions are confused in the proposals currently being promoted by vocational interests in several states. NSPE influence in these areas could help to clarify such situations.

This brings up another question: What is the relationship between acceptable technical-institute type curricula and the typical basic "pre-professional" curricula of the junior college or "lower-division" collegiate curricula leading to the engineering degree? At the risk of over-simplification, I may say that the person who finishes the first two years of an engineering curriculum as presently catalogued by most of the ECPD-accredited engineering colleges and universities is *not* adequately prepared for productive employment, either as an engineering technician or as an engineer. Such a person has too much of too little to qualify as an engineering technician, and he is only at the threshold of his engineering professional-technical subject matter.

This leads to another point of major importance and all-too-much confusion: This is the misguided idea that the zone of the engineering technician is the natural "dumping ground" for those who "can't make the grade" in engineering. As a matter of fact, most of those unfortunate misfits who "cannot make the grade" in engineering as now handled educationally or professionally would be just as miserable misfits in the field of the engineering technician. Part of this confused thinking—if it be "thinking"—is just carelessness; part of it is ignorance, whether willful or accidental; and part of it—let us face it—is selfish fear of loss or compromise of social or professional "position" by our friends and associates in border-line zones of educational or professional enterprise. Regardless of source, all such confusion is damaging to everybody concerned.

The field of the engineering technician is no more logically to be considered the "dumping ground" for misfit engineers than is the field of engineering logically to be

(Continued on page 45)

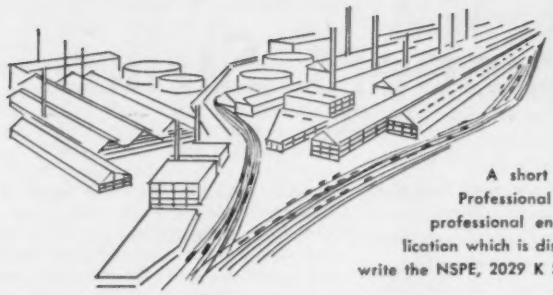
About the Author . . .

Mr. Henninger

G. Ross Henninger is president and member of the board of directors of Ohio Mechanics Institute and College of Applied Science, Cincinnati, Ohio. Born in Hamilton, Ohio, he was graduated from the University of Southern California in 1922 with a Bachelor of Science degree in electrical engineering.

Prior to assuming his present position on June 1, Prof. Henninger was associate director of Engineering Extension at Iowa State College. Active in several professional organizations—including the chairmanship of the American Engineer Committee—he has served during the past year as director of a national survey of technical institute education being conducted for the American Society for Engineering Education under a grant from the Carnegie Corporation. He is a member of the Committee on Technical Institute Curricula, Task Force, President's Committee on Scientists and Engineers. In addition to being active in the ECPD, he is a Fellow of the American Institute of Electrical Engineers.

ENGINEERING EMPLOYMENT PRACTICES



DIGEST

A short digest of a monthly bulletin published by the National Society of Professional Engineers in the interest of advancing cooperative relations between professional engineers and their employers. To regularly receive the complete publication which is distributed widely to industrial, commercial and educational organizations, write the NSPE, 2029 K St., N.W., Washington 6, D. C.

✓ A two-week strike of approximately 1,800 engineers and scientists employed in the Research and Development Departments of RCA's Camden (N.J.) area operations ended on July 19. The strikers, represented by the Association of Professional Engineering Personnel, ESA, walked out and established picket lines when negotiations for a new collective bargaining contract failed.

The chief issues which led to the strike involved the union's demand for a guaranteed merit kitty and a new layoff and recall program. The settlement states that the union and the company will jointly develop a merit review plan to be instituted in 1959. The layoff and rehiring procedure, as agreed to by the parties, permits bumping between locations in the Camden area and establishes retention credits based on salary, merit review record, education, length of service and experience.

The strike, the sixth such strike by an engineers' union in the past five years, has served to revive the debate over professionalism v. unionism. The APEP group has often been proclaimed by ESA leaders as a leading example of a highly professional group within the union federation. In urging a settlement on its terms, the union referred to its strike action as causing a "deplorable delay of critical defense contracts. . . ."

* * * * *

✓ **As Congress is in the stretch drive for adjournment, one of the major items of professional import is the Kennedy-Ives labor reform bill. NSPE has called upon the House members, supported by state society, chapter and individual action, to demand hearings before adopting the Senate-passed provision setting up special rules for the construction industry. These provisions would operate to permit professional engineers employed in the construction industry to be forced into a building trades union without a separate vote. At press time, Speaker Rayburn had referred the bill to the House labor committee and it is expected to die there. However, there is still some talk of trying to bring it to the floor without committee approval which would require a two-thirds vote.**

* * * * *

✓ The President has signed into law the bill to provide training in and out of Government for Federal employees. The Civil Service Commission will administer the law, and agency heads will be responsible for training details, such as the kind of training, selection of employees and allocation of funds. Trainees will be required to remain in the agency for at least three times the length of the training period, or repay the training costs.

* * * * *

✓ **The following item is taken from the "Texas Professional Engineer," published by the Texas Society of Professional Engineers, July, 1958, issue:**

"The State Registration Enforcement Committee, H. Q. Haile, Jr., of Austin, Chairman, has defended the title, 'Engineer,' on a national scale. Attention to the infraction was called by the Panhandle Chapter when an employee of Air Temp Division, Chrysler Corporation, termed himself 'Field Engineer,' a label TSPE takes exception to because it is not always used to designate a registered or professional engineer. He is more often a field representative with technical training.

"Haile contacted Dayton, Ohio, headquarters of the Chrysler Corporation and presented TSPE's case to the Director of Personnel. Chrysler Corporation has acquiesced to TSPE and will discontinue use of the term 'Field Engineer' in Texas. The Director of Personnel expressed a desire to work with TSPE and lend technical assistance in the application and installation of mechanical equipment. He termed Chrysler Corporation a service organization and offered these services in helping engineers put equipment in the proper place."

* * * * *

✓ The Department of Labor has published, "Employment Outlook for Technicians," which contains valuable reference data for those interested in technician manpower supply and relationship to engineers. Available from Government Printing Office at twenty five cents per copy. . . . The Association of Professional Engineers of British Columbia recently received accolades for its conduct and public statement during a strike of utility workers which threatened to cut off the only available electric service. The professional group supported the action of the company's P.E.'s in keeping service open during the strike because the engineers' prime responsibility is to the public. . . . NSPE member John Constance is the author of "How to Become a Professional Engineer," a 272-page book on the why, what and how of engineering registration. Published by McGraw-Hill, N.Y., $5.50.

* * * * *

✓ **The NLRB's General Counsel has ruled that professional employees represented by a union can escape further representation by withdrawing when the collective bargaining contract has expired. Fifteen pharmacists withdrew from a union of forty-five rank-and-file employees and employer refused the union's demand to bargain for the professionals. The union's unfair labor practice charge against the employer was dismissed by the General Counsel because the law gives professional employees a separate vote, and the withdrawal to form a professional unit was, in effect, an exercise of the professionals' right. This decision is a partial retreat from the NLRB policy that professional employees who are part of an over-all unit cannot secure a separate decertification vote for the professionals only.**

Comments on Professional Aspects of Engineers' Strike

In July approximately 1,800 engineers and scientists, represented for collective bargaining by the Association of Professional Engineering Personnel, ESA, went on strike and established picket lines at three plants of RCA near Camden, N.J. The two-week strike has served to revive the controversy over professionalism v. unionism. The following three statements are pertinent to this discussion. NSPE President Dunn's statement was issued at the request of an engineering magazine and the two letters are reprinted verbatim as they appeared in the Camden Courier-Post.

The recent two-week strike of engineers and scientists employed in the Research and Development Departments of RCA's Camden area operations is further confirmation of NSPE's long-held viewpoint that professionalism and unionism are incompatible, according to a statement issued by Clark A. Dunn, president of the National Society.

In response to requests for Society comment upon the strike which was conducted by the Association of Professional Engineering Personnel (ESA), representing approximately 1,800 engineers and scientists, Dr. Dunn said that wherever unionism has spread to engineers it has been followed by strikes, picket lines and other usual union tactics.

"It has long been obvious that if engineers want unions they must accept the consequences," Dr. Dunn said. "It is foolhardy to pretend that the concepts of professionalism can survive or flourish in an atmosphere of collective bargaining. This latest strike is nothing new in proof of our comment. It was, in fact, the sixth strike by an engineers' union in the past five years."

The NSPE spokesman added that the Society has urged upon professional engineers a realization that they "cannot have their cake and eat it too." He said that the evidence shows that many of the present engineering unions proclaim their devotion to professional concepts, but the recent strike, added to others, plus demonstrations and other union tactics, show that such a claim, even if sincere, is a mirage and a delusion. "Professional engineers are realists," Dr. Dunn said, "And they know that professional status must be based on public understanding and recognition for their professional contribution to society. It is rather futile to look for this response from the public while walking a picket line a la trade unions. It should be noted in this regard that the engineers' union based part of its argument for a settlement on its proposed terms on the ground that essential defense work was being delayed by the strike.

Frustrated Engineer Faces Issue

"These comments are not intended to indicate any opinion regarding the validity of the matters at issue in the strike or to say which party was at fault," he added. "The purpose of these statements is to emphasize the firm belief of the National Society of Professional Engineers that the only professional method of solving grievances between professional engineer and employer is through the development of effective communications between the engineers and management."

The NSPE president said that the studies of the Engineer-in-Industry Committee have led to the firm conclusion that the only sound approach to the problems of employed engineers consistent with professional concepts is through cooperative relations with management and all elements of the engineering profession.

"I am so ashamed of myself that I am forced to write this letter although my talents lie in other than literary spheres.

"When I entered RCA, I was considered to have a great deal of potential and my associates now seem to feel I am a good engineer. I have absolutely no grievances against the company. I have engaged in a series of interesting projects, have received free advance education, and my pay is remarkable for a man of such little experience and in relation to men of equal ability who joined other companies.

"Today, I am involved in a union and a strike and my whole philosophy in life rebels against what I am doing. It's not even clear to me how I got involved in this 'professional society,' yet I can't leave it in a crisis as I would look even more cowardly than I am.

"My friends in management and in mine and other professions are disgusted with me—and should be. I believe in unions in certain types of work where the difference between the good and mediocre worker is not crucial. However, your happiness as individuals and the very welfare of the nation may well depend on differentiating between the good and mediocre engineer.

"I am in a dilemma. I am not interested in becoming a part of management as I like to work more independently. I am too much of an individual to favor a union. I cannot in the future be recognized to any great extent individually as traditionally, unions have eventually equally recognized all people in the same classification regardless of talents. I cannot depend on weight of numbers as I feel I am a good engineer and, as in all professions, there are more mediocre than good performers. The quality of my work is my best weapon and this weapon will be destroyed.

"Naturally, my only alternative is to leave RCA to save my self-respect. This I will do as soon as economic conditions permit and I can uproot my family. I only hope that others will learn from my experience and that the public will not judge all engineers from our performance at RCA.

"FRUSTRATED ENGINEER"

Answer Given to Frustrated Engineer

"Kudos to 'Frustrated Engineer' for his eloquent exposition of the predicament in which RCA Engineers found themselves. It is rarely that an engineer can be so articulate in the use of English.

"I would like to suggest to 'Frustrated' that he has other alternatives than quitting RCA. It would be a tragic loss to a company with the reputation for outstanding engineering talent enjoyed by RCA, if very many engineers shared the opinion that the only way to restore their self-respect lay in leaving the company.

"The Association of Professional Engineering Personnel does not have a union shop contract with RCA. 'Frustrated' need never have joined. If he feels that he was duped into joining by the belief that APEP was, as its name implies, a true association of professional engineers, he should resign. It is

certainly not necessary for him to leave the company. If he really resents the unprofessional actions of APEP during the past two weeks, he can best make his objections apparent by returning to work. This requires only a relatively small amount of intestinal fortitude. It is a sad commentary upon the ethical standards of the engineering profession, if loyalty to a union transcends the devotion of the members of that profession to those standards.

" 'Frustrated' can take an even more positive stand for professional ethics by the expenditure of a small amount of effort. He can obtain a license to practice engineering from the State of New Jersey, giving him the legal right to entitle himself a professional engineer. If he is as good an engineer as he appears to be, the required examinations should hold no terrors for him. He will then be eligible to join the National Society of Professional Engineers, a rapidly growing organization of 45,000 engineers, every one with the legal right to call himself a professional engineer. This organization is devoted to promoting the professional and economic status of engineers. It has no objection to engineering employes associating themselves to promote these objectives. It encourages such organizations.

"But it does have a firm conviction that joining unions and participating in strikes are inconsistent with the high ethical principles of a learned profession.

"By following this procedure 'Frustrated' can restore his self-respect and enjoy the respect of real professional engineers both in RCA and out without sacrificing his position with the company where his opportunities for advancement in his chosen profession are admittedly so great. Those who did not respect his conduct would certainly not deserve the proud title of professional engineer.

"THEODORE H. STORY, P.E.
"Merchantville"

New York State Society of Professional Engineers—Fall Meeting, September 11-13, 1958, Hotel Utica, Utica, New York.

Virginia Society of Professional Engineers—Annual Meeting, October 16, 1958, John Marshall Hotel, Richmond, Virginia.

National Society of Professional Engineers — Fall Meeting, October 23-25, 1958, St. Francis Hotel, San Francisco, California.

National Society of Professional Engineers—Winter Meeting, February 19-21, 1959, Dinkler-Tutwiler Hotel, Birmingham, Alabama.

Allison C. Neff, Past President of National Society, Dead at 55

One of NSPE's most ardent supporters, Allison C. Neff, Society president in 1955-56, died August 11 after a heart attack at his home in Middletown, Ohio. He was vice president and Central Division manager of Armco Drainage & Metal Products, Inc.

Mr. Neff, 55, served as a member of the Board of Directors of the National Society from 1948 to 1950, and was also active in committee affairs. His most recent efforts were in 1957-58 as chairman of both the Committee on Improved Professional Activities and the Nominating Committee.

Allison C. Neff

He also served as president of the Ohio SPE and the Cleveland Society of Professional Engineers. He was a member of the Professional Engineers Conference Board for Industry, The Engineering Society of Cincinnati, and an associate member of the American Society of Civil Engineers.

A native of Cleveland, Mr. Neff received a B.S. degree in mechanical engineering from the Case Institute of Technology in 1925. He began his career as assistant city engineer in East Cleveland. From 1929 to 1944 he was associated with the Ohio Corrugated Culvert Company. He joined Armco Drainage in 1944 as Ohio sales manager. He was named Central Division manager in 1944 and vice president in 1945.

He was councilman and member of the City Planning Commission of Braker Heights, Ohio, from 1944 to 1946. He served as vice president of the Ohio Highway and Turnpike Association from 1948 to 1957. From 1952 to 1957 he was president of the City Planning Commission of Middletown.

He is survived by his widow, Helen, and three sons, Allison, Jr., William, and Richard.

Hail House Passage of Jenkins-Keogh Bill

"The overwhelming House passage of the Jenkins-Keogh Bill (H.R. 10) on July 29, 1958, represents a significant step toward achieving a measure of tax equality for this nation's ten million self-employed business and professional men," Robert C. Vogt, P. E., representative of the National Society on the Executive Committee and Board of Directors of the American Thrift Assembly, said in a statement immediately following the House vote. Mr. Vogt is a senior partner in the Cincinnati, Ohio, consulting engineering firm of Vogt, Ivers, Seaman and Associates.

"Professional consulting engineers, along with other groups of professional and self-employed businessmen who have actively supported the American Thrift Assembly in its efforts to have the Jenkins-Keogh Bill enacted into law, can take great pride, for this

(Continued on page 49)

Deceased . . .

Robert F. Blanks, of Denver, Colorado, member of Colorado Society of Professional Engineers.

Daniel Webster Cole, of Marietta, Georgia, member of Georgia Engineering Society

Ernest G. de Coriolis, of Toledo, Ohio, member of Toledo Society of Professional Engineers.

Walter Ferris, of Milwaukee, Wisconsin, vice president, The Oilgear Company.

C. W. Hanson, of Harrisburg, Pennsylvania, member of Pennsylvania Society of Professional Engineers.

John K. Hoskins, of Chevy Chase, Maryland, former Assistant Surgeon General and chief of the Sanitary Engineering Division, Public Health Service.

Jacob Mark, of Scarsdale, New York, member of New York State Society of Professional Engineers.

Charles W. Mitchell, of Brooklyn, New York, member of New York State Society of Professional Engineers.

Walter B. Morton, of Bethlehem, Pennsylvania, member of Pennsylvania Society of Professional Engineers.

Kenneth W. Reed, of East Cleveland, Ohio, member of National Society of Professional Engineers.

James J. Ryan, of Warren, Pennsylvania, member of Pennsylvania Society of Professional Engineers.

The Golden Gate Bridge

Varied Program Planned for Fall Meeting October 23-25

REPORTS covering all facets of the engineering profession—many of vital importance—will be presented to NSPE's Board of Directors at the fall meeting in San Francisco. The dates: October 23-25. The place: St. Francis Hotel.

In addition to these committee reports, a varied program is on tap for those members journeying to the West Coast. Bert Hirsch, president of the host Golden Gate Chapter, is heading the steering committee for this final NSPE session of 1958 and states that every effort is being made to make the meeting a memorable one. Mr. Hirsch recently replaced Leo W. Ruth as committee chairman after the latter was elected California SPE president.

An innovation from regular NSPE meetings has activities starting with a noon luncheon on Thursday, October 23, rather than the usual opening dinner. George Christopher, mayor of San Francisco, will welcome the members at this affair. Featured on the luncheon program will be a talk by James N. Landis, president of the American Society of Mechanical Engineers. He will discuss the role of unity in the engineering profession.

Paul Speegle, columnist on the San Francisco *Chronicle* will be the guest speaker at the banquet on Friday evening, October 24.

Some of the committee report topics and probable speakers are as follows:

Status of the revisions to the Model Registration Law—Robert Williamson, chairman, Registration Committee. Final outcome on the Society's most active year in national legislation, including reports on self-retirement plans, TVA engineering service provisions, the threat to the profession in the labor reform bill, NSPE's efforts in Federal pay raises for engineers and scientists, and the latest developments in education from the legislative angle. Robert F. Miller, chairman, Legislative Committee, will discuss these topics.

Progress on the development of student chapter programs will be given in a report by J. Neils Thompson, chairman, Student Chapter Committee. Implementation of the so-called "Texas Plan" for promoting membership will be discussed by Thomas T. Mann, chairman, Membership Committee.

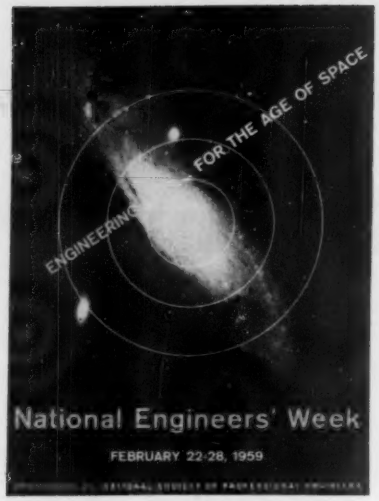
NSPE's participation in the Supreme Court consideration of the Lublin-McGaughy case, which will determine whether the Wage-Hour Law applies to consulting engineers, as well as NSPE's *amicus* brief in the Kyne case, which involves a defense of the professional provisions of the Taft-Hartley Act, will be covered.

The plans, progress and current status of the Society's Voluntary Fund Campaign will be reported on by John D. Coleman, chairman, Committee on Income.

Naturally, there will be many other reports given at the fall meeting, but the above mentioned will highlight the sessions.

Ample time will be given to the social side of the program for both members and their wives. Included among the events will be a cocktail party at the famed Omar Khayyam restaurant.

"Snug Harbor"—Sailboat Regattas are favorite sports events at Clear Lake, popular summer playground in the Northern California segment of the Redwood Empire. The lake is a rendezvous for tourists and vacationers who enjoy water sports and fishing.



Poster design for the 1959 National Engineers' Week. The posters are available in two sizes from the National Society. More than 30,000 posters were used during the 1958 Week on industry and school bulletin boards, in engineering offices, and in store window and other exhibits.

Plans Progress for '59 National Engineers' Week

A celestial object more than half a million light years distant from our solar system is featured in the basic poster design for the 1959 National Engineers' Week, February 22-28.

The object pictured is the so-called Andromeda Galaxy, actually a giant pinwheel made up of billions of stars and believed to be about the same size as our own Milky Way Galaxy.

The striking night sky photograph, made with one of the world's largest telescopes, is designed to emphasize the theme for the 1959 Week, "Engineering . . . for the Age of Space." This theme was selected to call attention to the role played by science and engineering in bringing about the new era which America and other nations are now entering—the era of the exploration of the space outside the atmosphere of our planet.

Promotional material for the Week will point out how engineers are now working at the "frontiers of knowledge" in their efforts to increase man's understanding of the universe. Considerable publicity is expected to result from the fact that American and Soviet space activities will very likely include lunar satellites by February 1959, and perhaps even attempts at orbiting satellites around the Planet Mars.

The 1959 theme will be the basis for newspaper and magazine articles, prepared speeches, and radio and TV announcements. The theme will also be used in career conferences for high school juniors and seniors, exhibits on engineering achievements, and many other projects dramatizing the importance of a sound educational background in mathematics and the physical sciences.

As in previous years, a group of leading engineers are being asked to lend their names as sponsors of the Week. The full list of sponsors for the 1959 Week will be published in the October issue of the AMERICAN ENGINEER.

Promotional kits prepared by the National Society will be sent to all NSPE affiliates early in October. The kits will contain five sections devoted to suggestions for developing a basic Engineers' Week program at the chapter level. The suggestions cover newspaper publicity, radio and TV public service time, exhibits, talks for a general audience, and ideas for a number of special projects. One complete section in the kit will be devoted to suggestions for planning and organizing projects involving school groups and educational matters.

Promotional aids such as one-minute TV films, radio tape recordings, posters, banners, logotypes, newspaper mat stories, lapel buttons, and gummed seals will be available from the National Society headquarters office. Order blanks describing these promotional aids and listing prices will be sent to all local chapters and state societies. A series of "Action Letters" will also be mailed from the National Society to keep local Engineers' Week committee chairmen informed as to the promotional material being offered.

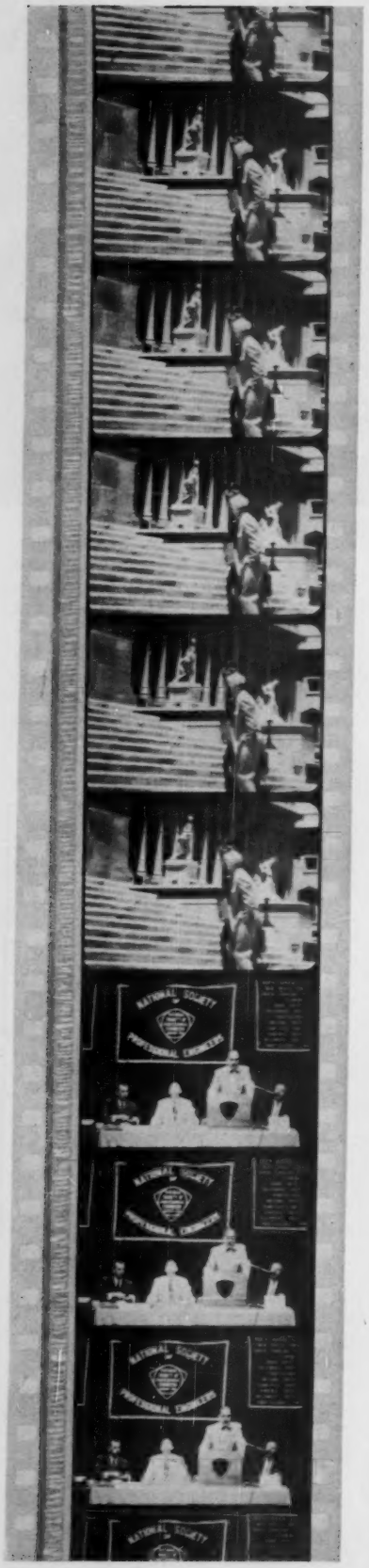
(Continued on page 49)

A Message From John L. Bahr, Chairman of National Engineers' Week:

September means organizational meetings for many NSPE chapters and state societies. For those groups determined to have a successful Engineers' Week observance in February, 1959, it is also the month for organizational committee meetings to launch the advance planning necessary for this annual program. As national chairman, I have had the opportunity to see just how important this advance planning is for the success of any Engineers' Week activity. An early organized committee is an early functioning committee. The committee that begins functioning in early fall is the committee that will be able to undertake large projects in February without the overly severe work load which inevitably falls on those who wait until the first of the year to get underway. Make sure your chapter organizes its Engineers' Week committee the second week in October.

National Engineers' Week

FEBRUARY 22-28, 1959



"Building for Profe

New 20-Minute, N

"BUILDING for Professional Growth," a 20-minute film covering NSPE activities at the chapter, state, and national levels will be available to all National Society affiiates beginning October 15.

The new 16mm film was recently completed at the NSPE headquarters in Washington, and is based on a script developed for the Public Relations Committee. Authorization for the production of the film was given to the Committee by the NSPE Board of Directors at the East Lansing meeting in February of this year. The film will be "previewed" by the Board of Directors at the San Francisco fall meeting, October 23-25.

Production and distribution of "Building for Professional Growth" marks a significant milestone in public relations for the National Society. For the first time, all local chapters and state societies will have a filmed presentation of the three-level activities of their professional engineering organization. Produced on a limited budget, the film is expected to "point the way" for future public relations projects involving films made under National Society sponsorship.

Authorization for the film was essentially the result of the recognition by the Board of Directors of the need for greater communication among NSPE members and potential members as to the extent of the three-level operation of the National Society.

To illustrate the three-level character of NSPE, the film has scenes of actual chapter and state society meetings, as well as scenes taken at the national-level meetings at East Lansing and St. Louis.

Prints of the film may be reserved by local chapters or state societies for any dates throughout 1958-59 by using the coupon below. The $10 rental fee for each reservation is being asked to help defray production and distribution costs. Because of the limited number of prints available, chapters and state societies are requested to list three choices of showing dates. Prints will be shipped from the National Society headquarters in time for showing on one of the three dates listed. Reservation dates will be confirmed by letter from the National Society well in advance of the scheduled showing.

Alert membership, meeting program, and other committee chairmen interested in utilizing the NSPE film will realize that reservations should be made as far in advance as possible.

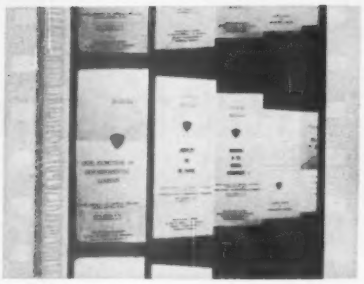
A new issue of the NSPE Public Relations News Letter will call attention to the film and carry a reservations coupon. The News Letter will be mailed in September to all local chapters and state societies. The News Letter will also introduce an eight-page booklet which suggests specific ideas for chapter and state society use of the film to help inform potential members—and existing members—about the purposes, objectives, and accomplishments of the National Society. A copy of the booklet, *Ideas For Your NSPE Film Program*, will be included with each film reservation.

In addition to the booklet, each print shipment from the National Society will include a copy of a 15-minute talk on the organization and objectives of NSPE. The talk was prepared for delivery to potential members at chapter membership meetings. It outlines the basic history of the founding and early development of the National Society, and follows this up with statistics concerning present membership. The talk calls attention to the way in which individual members build for professional growth through participation in a three-level approach to professional problems.

Copies of the talk may be reproduced by local chapters and distributed to potential members as "take home" literature.

The film is based around a series of scenes illustrating three-level NSPE activities with a description and anal-

fessional Growth"—
NSPE Film Available



ysis of these activities by voice narration in the background. Starting with typical scenes at chapter and state society meetings, the film moves on to the national level to show how decisions first made by the chapters become part of a national approach to engineering professionalism.

The major part of the film is devoted to presenting NSPE activity in these areas:

Inspiring and leading the programs calling attention to the importance of engineering registration; gathering, publishing, and distributing data and information on vital issues concerning the engineer in industry, government service, education, private practice, and other fields; cooperating with the Congress and state legislatures on legislation affecting engineering and the public interest, and developing and executing public relations programs such as National Engineers' Week to call attention to the role of the engineer in building for progress.

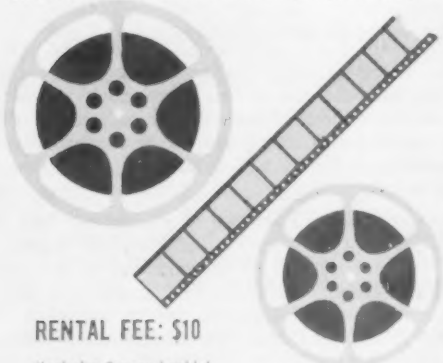
Each of these areas is presented in the film by appropriate visual scenes and background narration. To illustrate legislative cooperation, for example, the narrator asks the question: "What is the importance of a vigorous legislative activity to the professional engineer?" Newsreel scenes of open hearings in the Capitol and shots of NSPE officials testifying on engineering matters are backed up by narration calling attention to the scope of National Society legislative efforts.

Other scenes in the film show how a continuous stream of projects flows from the chapters and state societies. These projects include the *Professional Engineers' Income and Salary Survey*, the five executive research survey reports made for the Professional Engineers Conference Board, the research study conducted by the NSPE Engineer-in-Industry Committee entitled *A Professional Look at the Engineer in Industry*, the career booklet entitled *Engineering—A Career of Opportunity*, and a number of other publications made under the sponsorship of the National Society.

The AMERICAN ENGINEER magazine, public relations projects such as news letters and news releases, and the National Engineers' Week program are also described in the film. The objective here is to show how the National Society conducts a day-to-day public relations program through press releases for newspapers, magazines, and industry and society publications. The narration in these scenes points out how widespread publicity in the engineering press means recognition for the efforts of the NSPE membership and committees as developed through chapter, state, and national level activities.

The chief "selling point" of the film for potential members might well be summed up in the narration given by a past president of the National Society: "World events have brought the engineering profession into the glare of public attention as never before. Public interest will increase as we move into such areas as space technology, nucleonics, and the like. This increased responsibility will demand an increase in professional growth and development. I believe the key to this growth and development is to be found in the professional society and only there. None of us can possibly have the time or facilities to accomplish as individuals the things the National Society can accomplish in terms of building for personal growth and development through public service and professionalism. It is in the chapter meetings that this building begins; it is

(Continued on page 49)



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For Industrial Careers . . .

Professional Development of Engineering Students

The following two papers were presented at NSPE's annual meeting in St. Louis. The remaining two papers will appear in the October issue.

The young engineer should look to extension of his engineering education in graduate study, the author believes.

Continuing Education After Graduation

By

ARTHUR M. GOMPF, P.E.

Consulting Engineer

GRADUATION from an engineering school, coming as it does after sixteen or more years of regularly scheduled classroom activity, has been greeted by some as an end to the processes of education. Those of you who might have been called upon to interview and examine engineers for employment or for civil service ten or twenty years after graduation must have been impressed, as I have, by a certain portion who, upon leaving engineering school, had apparently abandoned all inclination for further development. I have, on occasion, asked such men what they read. Responses vary, of course, but the failure to keep up with engineering material and allied information begins to show. I have then followed by asking what engineering meeting during the past year has most benefited them. This frequently evokes an interesting series of reasons why they have not been able to attend such a meeting lately.

These extreme cases are not general, fortunately. But, to the extent that they do exist and to the extent that there are others who have not developed their fullest abilities, we have a loss, a waste, in the engineering profession. It is the responsibility of the engineering societies, technical, educational and professional, to supply the means and the stimulus which will catch up every engineering graduate and help him develop into the fullness of his professional career.

The direction should be set before graduation. This is accomplished in most areas by the faculties, the engineer-in-training examinations and by the cooperative activities of the local professional societies. This should introduce the graduate, the young engineer, to the existence of the next steps. From here, then, the atmosphere of development must continue.

Obviously, much of the inspiration for professional development must generate within the individual. The most we can do as a society and as practicing engineers is to

help create the atmosphere of development and to help provide the opportunities.

There are many means to this end. Here are some of them:

Consider Graduate Study

After completion of the first degree engineering curriculum, the young engineer should, if there are suitable aptitudes and circumstances, look to extension of his engineering education in graduate study. The past few years have seen a considerable growth in the graduate study facilities for engineers. There remains much, however, that can be done in this area.

There appears to be no particular problem for a man to take graduate work on a full-time residence basis; no problem, that is, if finances can be arranged and the conditions and temperament are suited to adding to the sixteen years already spent in full-time education.

There seems, however, to be much that can be done to extend the opportunity for part-time graduate work. This is a condition which varies across the country, but certainly in some areas, it could be improved by further collaboration between the educators and the practicing engineers of our society.

In addition, we have a valuable opportunity to point out to our younger associates the need for further training in particular aspects of the field in which they are working. In other words, we can and should furnish the reasoning for and the encouragement toward graduate study.

Participation in Technical Societies

The young engineer, not unlike his counterpart in the other professions, needs the ground on which to meet his contemporaries in interest and in work. The great technical societies of our country provide the means for the engineer's development into any of many specialized areas of engineering.

Engineers should be encouraged by and permitted by their industrial employers to participate in the divisions of the technical societies aligned with their respective fields of endeavor. Active work in these divisions exposes a man to others, from other companies, working in the same general field. The exchange of ideas, the development of industry standards, the probing into new applications, all of these and many more areas of common interest enrich the individual and likewise bring to his employer the benefit of stimulated thinking.

Each year, a wealth of material is presented at meetings of the national technical societies. The American Society of Mechanical Engineers, the technical society with which I am most familiar, has expanded its meeting programs so greatly that much effort must now be expended to properly schedule and fit together the many aspects to avoid, as far as possible, conflicts of interest.

For example, at the annual meeting of the ASME in New York in November, a total of about 110 technical sessions are scheduled. These will be operated in the morning between 9:30 and 12:00 noon and between 2:30 and 4:30 in the afternoon for five days, with an added two sessions in the evening. At times there will be twelve or more sessions operating simultaneously. At each of these sessions as many as four papers are to be presented.

It cannot be represented that all of this great volume of material is either new or good. But, as well as such things can be regulated, an effort is made to obtain freshness and quality.

Participation of the engineer in these technical activities develops other abilities. From listening to papers, he should quite naturally move into presenting papers. From seeing sessions operated, he should quite naturally move to assistant chairman, to chairman. Here is an area of rounding out necessary to many engineers.

Informal Professional Courses

At the fall meeting of NSPE in White Sulphur Springs there was considerable discussion of the introduction of certain courses related to the professional concepts in engineering into the curriculum of engineering schools. There were cases in which such courses did not receive the adequate support of the faculty and administration. It was thus indicated as a long road to bring about the inclusion of such work in the standard engineering curriculum.

But then, even after some progress is made in this direction, what about the recent graduate who missed exposure to such work? These recent graduates, the current graduates and many yet to come, not reached by any such training, will do much to shape the direction of the profession during the next ten to twenty years. Why not then set up informal courses, available to these young engineers, through the state society of professional engineers?

It was from such thinking that the course in "Acquired Professional Concepts in Engineering" came to be offered by the Maryland Society of Professional Engineers last year. It consisted of six sessions, presenting such subjects as: The History of Engineering as a Profession; Engineering Ethics; Engineering Legislation; Engineering Registration; Employment Practices, and Professional Activities.

The sessions were held in the auditorium of one of the public libraries from 8:00 p.m. to 9:30 p.m. one evening a week. A fee of $5.00 was charged for the course.

A total of 95 men registered for the course. They were employed in various fields; 37 in industry, 28 in private practice offices, 17 in public utilities, 9 in government and 2 by contractors. Of the 95 who entered, 65 completed the course and prepared the required course paper. Certificates were issued to these men.

It appears from data taken in a questionnaire that the lecture on Engineering Legislation was of the most interest to the greatest number of students. This information was considered to be the most needed and many suggested that more time should be given to this subject. The Maryland Society had been fortunate in obtaining the services of Milton F. Lunch, NSPE's legislative counsel, and Paul H. Robbins, NSPE's executive director.

About the Author . . .

Mr. Gompf

Arthur M. Gompf was born in Pikesville, Maryland, in 1909. He was graduated from the Johns Hopkins University, School of Engineering. Mr. Gompf is president of Egli and Gompf, Inc., Baltimore, Maryland. He is registered in Maryland, West Virginia and Washington, D. C. He has served as president of the Building Congress and Exchange of Baltimore, the Maryland Society of Professional Engineers, and the local chapter of the American Society of Mechanical Engineers in Baltimore.

He is a member of the American Society of Heating and Ventilating Engineers and American Institute of Electrical Engineers. He is on the board of directors of the Progress Federal Savings and Loan Association and is active in various civic groups including Civitan of which he is now president.

for two lectures, and I must point out that nearly everyone who commented included some reference to the excellence of these speakers' presentations.

Here are a few of the random comments made upon the course in general:

"The course answered many of my questions concerning the professional attitude an engineer should cultivate."

"The course is one of the most valuable I have ever taken—including college courses."

"Good start. Need more of this type course. Need more support by engineering societies and industry."

"Many of the facts presented are not common knowledge among engineers."

"I would suggest the addition of other courses, similar in nature on other subjects intended to broaden knowledge of the profession and its activities. This approach is necessary to develop unity."

"Pretty good for a starter, could use more meat and less wind."

"Pleasantly surprised! Administration was excellent. Material handled well."

"I think that this course would be as valuable, if not more valuable to those who are already registered than those who are interested in obtaining a license."

"Should be on a little higher plane."

"Future publicity should emphasize the range of this course to the young engineer, the E.I.T. and those who desire to become professional engineers."

These were not all of the comments received but they are representative. The students were asked to suggest, in addition, new subjects they would like added. In general, these suggestions were extensions of the same type of material already covered. It is interesting to note that only five of those who took the course rated it "not very useful," all others rating it "worthwhile" or higher.

WE believe the comments received and the enthusiasm of the students adequately points us to the need for the extension of the program by our societies. In Maryland, we plan a repeat course next fall. We commend this work to you as a worthwhile and a productive activity for the future of the profession.

In his classic *Professional Guide for Young Engineers*, Dr. Wickenden wrote:

"In the first mile men must work to live; in the second they work to maintain their sense of dignity and worth. In the first mile men seek subsistence and tangible rewards; in the second they strive for the durable satisfactions of life. In the first mile men seek pleasure; in the second they discover happiness. In the first mile lie the fleeting thrills of marriage; in the second, often at the end of a long road of self-denial, are to be found the enduring fruits of the merging of two personalities. The first mile is the mile of discipline; the second the mile of freedom. Beyond the mile of evidence and logic or the mile of sight lies the second mile of intuition and insight, which men and women whose work calls for creative imagination can least afford to ignore; physicists and mathematicians are likely to be right in the first one; while poets and artists are more likely to be right in the other."

Here is an ideal. Here is depth to be added to the engineer's work, to the engineer's life.

The engineer should develop a taste for fitting his particular work into the pattern of life as a whole. He should try to develop an understanding of many things of the world about him. He should appreciate the problems that others seek to solve. He should understand his work to be another part of the great machine of life.

The engineer should develop a pride for perfection. Perfection, we know, is elusive and seems always beyond our reach. But, unless the goals are set at the ideal, the achievement is likely to fall far short. Great men in engineering, and in all walks of life, point this way. The engineer needs to know something of these leaders who have gone before.

Then, too, the engineer must keep abreast of the rapid developments in his own and in allied fields. The pace of expansion in our field makes this an absorbing effort.

The engineer should know something of the history of his nation, the law under which it operates, the economic pattern of this and other nations back through history, the arts and the allied sciences, the philosophies from which patterns grow; in fact, the engineer would do well to know all possible of the people and life about him and through all the ages.

For the development of depth, the engineer must look largely to the libraries; to the current and classic writings of many people over many years.

The young engineer should be encouraged in the development of his pattern of reading. Our offices and our plants should maintain well-equipped libraries furnishing not only the technical books and publications related to our own work, but those of the other phases of engineering work. In addition, there should be the publications on business, politics, world affairs, architecture and the like. I wonder if we should not also always include a liberal classical library.

In conclusion, and repeating, much of the inspiration for professional development must generate within the individual. As a society and as practicing engineers we can help to create the atmosphere of development and we can help to provide the opportunities. In the subjects discussed, and in the others not included, there lies many a challenge.—**End.**

The Professionalism Course—Today and Tomorrow

By

JAMES J. RYAN, P.E.

Professor, University of Minnesota

RECENTLY, I attended a three-day conference on college teaching, a part of the Minnesota Centennial program, sponsored by the Association of Minnesota Colleges. The principal speakers of national reputation presented talks on such subjects as "The Professor Looks at the Student," "How Do College Students Learn?," "The Teacher at His Best," "The Evaluation of Teaching," and "New Techniques of Teaching," with about nine hours of special interest group discussions, divided into about twenty-five areas.

As was most often expressed in this conference, it is the *individual* that learns, along with his professor, and the development of the full potential of his individuality is the aim of *all* the facilities for his education. Although the subject matter of the many disciplines was not considered, the philosophy, the psychology, and the many studies relating to the understanding of learning were reviewed.

It is thus particularly apparent that the living of a life, with the introduction to this life through a process of learning, suggests, as an obligation for being an individual, the necessity for consideration of the collective individuality of others. In each of us is born a feeling of interdependence, engendered by the privilege of an accumulation of knowledge; a need which may be fathered into a predominant interest in the common good, or which may passively revert to the state of common self-interest.

In the field of engineering, a woeful attempt is made to reinforce in school, and direct after graduation, the high aspirations which most students develop in their formal education. Although the two phases are inseparable, a greater amount of stress is placed upon the association of groups with like technical interests than upon an interrelation of these groups in the development of a profession of which they are a part.

Albeit a woe, the spark of this obligation has glowed into a candle light through our association, the National Society of Professional Engineers. I would like to examine the educational courses we have pursued in the interests of professional consciousness in the past, and to discuss suggestions for courses we may follow in the future to point out and encourage this professional fulfillment.

The Professional Course—Today

In my personal experience at the Institute of Technology at the University of Minnesota, there have been three main factors which have been influential in promoting the development of professional courses. Two are ever-present, the third was sponsored by the Minnesota Society of Professional Engineers.

The first factor is the teacher, or the professor. If we consider the negative elements, too many may neither be registered as a professional engineer, nor be a member of the State Society. There are professors who have taught and worked the long hours for many years to obtain the Ph.D. degree, with relatively little work-a-day experience except as a consultant. They may be teaching in allied fields more closely associated with pure science than with engineering. He may be an administrator with technical and operational problems requiring his complete attention. He may consider his active participation in a technical society as adequate professional interest. He may be so involved in research or consulting that his student contacts are at a minimum. The effect of these factors may make an approach to Dean Wickenden's "Second Mile" more delayed than we have suspected.

On the brighter side, the teacher or professor's personality and interests develop the student's professional concepts. Even an active professional society professor has to suggest the obligation of collective individuality and responsibility by only the best teaching methods. These are not criticisms; they indicate that in the past, the engineering teachers have not placed professional criteria on the same plane as other educational matter.

The second factor is the engineer-in-training examinations called to the attention of the students by the occasional appearance on bulletin boards of announcements and instructions. Dates may be given in the school newspaper, and articles may appear in the engineering college magazine. Certain of the faculty mention these examinations in their lectures and laboratories, and sometimes discussions are invited by the students.

One contact with the faculty is the requirement that five reference signatures are necessary on each student's application form. The request for signatures calls attention to the impending examination. This is the only outward expression or profession of professionalism that the engineering student makes prior to graduation.

Most students take advantage of this opportunity for registration and take the examination. In some engineering departments less than one-half of the students participate, even after thirteen years of this registration activity.

Allied with this factor is the background importance of the State Board of Engineering Examiners for Engineers, Architects and Land Surveyors. Occasionally talks are arranged for the students or they are invited to special meetings with the speaker, a member of the Registration Board, or his representative.

The Young Engineers Committee of the State Society has recently distributed literature to the graduating seniors as has been done at most schools throughout the nation.

The third factor is the interest of the Minnesota Society through its Educational Committee. Since many of its members are alumni of the University, they have a proprietory interest. Approximately fifteen years ago they planned and helped to inaugurate a course, Professional Problems, General Engineering 103, a one-credit course for graduating seniors of the Institute of Technology. This course consisted of about eight lectures with required attendance. A committee aided the administrative officer in choosing speakers, selected for their appropriate experience, to talk on professional subjects. Although the speakers and the subjects were varied to obtain the most effective presentations, the course has this year been made *elective* by most of the Institute's departments.

It might be well to dwell upon this third factor. In the past, it has served a real purpose. Certainly students could not but gain from the presentation of lectures with the following content: How to Approach an Interview;

About the Author . . .

Mr. Ryan

James J. Ryan was born in LeClaire, Iowa, in 1903. He received a B.S. in mechanical engineering from the State University of Iowa in 1925 and an M.E. from the same school in 1935. He obtained an M.S. in mechanical engineering at the University of Pittsburgh in 1929. In 1931 he became a professor in the Mechanical Engineering Department of the Institute of Technology at the University of Minnesota. He worked toward an advanced degree at Stanford University in 1939-40. He is a member of several honorary fraternities including Tau Beta Pi.

During his time at Minnesota, Professor Ryan has been a consulting engineer in many of the industries in the Northwest. He has invented several recording instruments including the Flight Recorder developed by General Mills, Inc. He is author of a number of engineering papers published in the technical literature. A member of ASME since 1926, he also belongs to other scientific and educational societies. He has held most of the offices in the Capitol Chapter and state organization of the Minnesota SPE. He was president of the State Society during 1954-55.

Engineering as a Profession and Professional Ethics; The Registration Board and Its Requirements; The Engineer's Activities in Industry; The Engineer's Activities in Government; The Engineer's Activities in Private Practice; The Engineer's Activities in Public Utilities; The Professional Society and Its Activities, and Unions vs. Professionalism, plus combinations and modifications of these topics.

THIS material is the basis for many NSPE meetings and its component societies. It can be presented to engineering students in a comprehensive and interesting manner. It was allocated a place on their program, and they received a credit for attending. Since a minimum number of credits are required for graduation, some other credit will now take its place. The attendance of a few students may be anticipated at an elective course.

The course of the engineering profession is brought to a sharp focus by the recitation above. We are constrained by the proposition that individuals are entitled to act as they see fit, but we have introduced a modifying ingredient which suggests that in the actions of individuals, they must consider the needs of others. If the ideals of engineering students can be partially maintained during the growing-up years in industry and elsewhere for a happier environment, then the slight effort at rearrangement of our ideas should be a price we can afford to pay.

I know that at many colleges of engineering the faculty, registration of engineers-in-training, and the professional courses for engineering students, are each doing their share toward the development of professional concepts. Only by comparing one situation with another can we stimulate the necessary thinking to broaden the pattern toward these goals.

The Professional Course—Tomorrow

It might be well at this point to review the statement of the problem:

It is thus particularly apparent that the living of a life, with the introduction to this life through a process of learning, suggests, as an obligation for being an individual, the necessity for consideration of the collective individuality of others.

To carry out the fulfillment of certain innate requirements of individuals approaching professional life, methods must be provided in the education process for definition and direction. The three factors (1) interest of faculty, (2) preparation for registration, and (3) active professional courses are more or less presently concerned, and since they are the core to the expansion of professional development, consideration of their attention is of prime importance.

Earlier I noted a few points which concern the faculty. Sympathetic consideration of a number of these factors and the others by the professional society would demonstrate the effectiveness of the group approach, and engender not only responsiveness but an enthusiasm. A committee of faculty members and practicing engineers would have much to gain for themselves and for the other faculty members by such an association. Not only should the experienced members of the faculty be proposed for registration under the Men of Eminence clause, but those registered should be invited to participate in society activities. They may not be onlookers by choice! It would be better to have the Professional Problems Course, G.E. 103, reinstated by a unified effort of a faculty than to continue on a basis not felt to be truly educational.

More important influences are engendered by a favoring faculty than the introduction of courses alone. These include the directed discussions of professionalism in class, the contact with current information on national and state legislation with respect to engineers, the development of student ideals which will not be subject to disillusionment in later life, familiarity with codes of ethics and rules of professional practice, and in general to consciously rub off onto the student the highest forms of conduct and understanding which are the best attributes of every profession.

Particularly is faculty cooperation desirable for the introduction and development of student chapters of the National Society. It has been reported that many state societies give membership for the rest of the year to graduating seniors as engineer-in-training (junior) members. I believe this is one of the most immediate and effective ways of directing and holding their attention. Earlier work must be done, however, by committees like Young Engineers, Student Chapters, Education, and others for adequate information. Particularly in the twin cities, where the two basic chapters are now spread out into six chapters, will the young engineer receive more personal attention at the meetings.

IN our Institute of Technology, orientation work has been greatly reduced. Freshmen, who have two years of common course work, are now partly excused from lectures on the various phases of engineering activities as carried on by the departments. Sophomore laboratory orientation in particular departments has been reduced to a short tour and lecture on the facilities. Perhaps this foretells a future in which the classical engineering departments will be superseded by phases of basic and applied activities stemming in a sequence from a common source. In such a case, the concepts of the practice of professional engineering may be developed in a similar manner, and the requisite stress applied to it as has been accomplished in the broadened courses which now include the humanities.

Two procedures may be suggested as far as the students are concerned. As student chapters are formed, it may be desirable that the students themselves develop an interest and take complete control of their professional activities. The second suggestion is that the formal professional course be offered in recitation sessions, with a faculty moderator, and a student-controlled discussion with adequate time for individual questions, as contrasted with a large assembly and a lecturer. Continuous efforts should be made to have the faculty bring professionalism to the attention of their classes.

Professional interest in the educational circles of engineering schools is growing rapidly with the expansion of the National Society of Professional Engineers. There will be no question of its importance in the future, but adjustments must be made for its accommodation.

The same is true in industry and other activities where the slow rise of professionalism is meeting resistance here and there, but the fundamental concepts are rapidly gaining ground. The plea is for patience with the faculty and the students, for, although they may lead the outside world in many respects, the concept of collective individualism, not only as it relates to themselves, but also how it determines their usefulness to humanity, is only now being developed.

If conclusions are permissible after my own personal observations, they would reiterate the fact that engineering is a profession and that the teaching of its tenets as a profession are a necessary part of the preparatory instruction. Not only is engineering a profession, but engineers are carrying on the practice of the profession with the purpose that their course will equal any other in service for the common good, today and tomorrow. **—End.**

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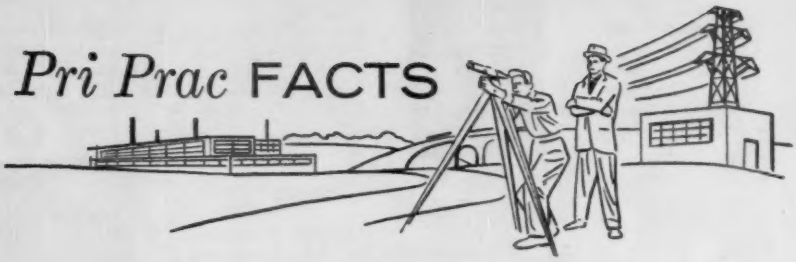
Pri Prac FACTS



ON July 29, 1958, by an overwhelming voice vote, the House passed H.R. 10, the Jenkins-Keogh Bill designed to encourage retirement plans among self-employed professional and businessmen. Consulting engineers, along with other private practitioners, could begin making deductions for taxable years beginning after December 31, 1958, if the Bill becomes law this year. As passed by the House, H.R. 10 would permit self-employed individuals to deduct from gross income the amount paid as premiums on a restricted retirement policy or as deposits in a restricted retirement trust fund. The deduction is limited to ten per cent of net earnings from self-employment, but not over $2,500 in one taxable year, or $50,000 for a lifetime. Higher annual deductions are permitted for individuals over fifty years of age on the effective date of the act.

Withdrawals are authorized to begin at age sixty-five, and must begin at age seventy. Withdrawals made prior to age sixty-five are permitted, but at a tax penalty. Taxes are to be paid on sums as they are withdrawn, but this will normally occur after retirement, when the individual is in a lower tax bracket.

While hurdles remain in both the Senate Finance Committee and the Senate itself, consulting engineers who have responded to previous NSPE requests for active support can well be proud of their contributions. The principle of Jenkins-Keogh and the idea for tax equality for the self-employed as compared to employees, has been before Congress for about ten years. House passage, however, represents the outstanding progress that has been achieved thus far. The lion's share of credit must go to the American Thrift Assembly, and its constituent organizations, including NSPE, who have worked arduously and consistently for Congressional approval. As indicated above, special thanks are also in order for the many consulting engineers and firms who so generously responded with financial assistance to the ATA through NSPE.

Despite last-minute protests of the National Society, state groups, chapters and many consultants, the House Public Works Committee approved a bill authorizing TVA to perform engineering services for outside interests under arrangements which provided for a tie-in to TVA operations. This authorization is contained in a highly controversial TVA revenue bond bill which had previously passed the Senate. In testimony immediately preceding the Committee vote, a spokesman for the Society informed the Committee members that NSPE and consulting engineers view this provision as an unwarranted Federal interference with private enterprise, particularly with respect to the independent practice of the professions. NSPE urged the Committee to delete the objectionable language from the bill. By a 19 to 5 vote, mostly along party lines, the Committee approved the measure without change. The bill has now gone to the House Rules Committee where it awaits the green light for placement on the House action docket. Several reports indicate, however, that there is a possibility of the Rules Committee refusing to give the "go" sign, with the result that the bill could very well die where it is. NSPE is watching these developments closely for possible additional Society action.

The latest NSPE effort to prevent competitive bidding for professional services by Federal agencies involved a new angle. The agency called for bids to prepare a technical handbook, based on data to be supplied by the agency. The bid forms described the services as "architect and engineering professional services." Detailed analysis and discussion with agency officials revealed that many commercial organizations with no claim to professional design ability or experience had been invited to bid. The discussion also revealed that the agency did not really consider the work to be of the type requiring professional knowledge and skill. As a result, an official amendment was issued deleting the words, "for architect and engineering professional services."

Consultants Urged By NSPE to Support Wage-Hour Case

In a recent memorandum to all consulting engineers and consulting engineering firms, Leslie C. Gates, chairman of NSPE's Functional Section for Engineers in Private Practice, has urged financial support for a legal defense fund to assist consulting engineers involved in situations similar to that now being experienced by Lublin, McGaughy and Associates. The Government has alleged that the Lublin, McGaughy firm has violated certain provisions of the Wage-Hour Act. After rulings from the Federal District Court and the Circuit Court of Appeals holding the firm not subject to the Act, the Government has appealed the case to the Supreme Court, which had agreed to hear the appeal next fall.

NSPE has been granted permission to file a brief in the Supreme Court as "a friend of the court."

Stating that the Functional Section has been authorized by the NSPE Board to solicit funds from consulting engineers and firms, Chairman Gates declared that firms in situations similar to that of Lublin, McGaughy "are faced with tremendous expense in defending a right or a principle which is vital to all consulting engineers, and many consulting engineers have indicated a desire to share in this expense in recognition that their rights are equally affected by the outcome of the case."

"The funds collected," Gates continued, "will be used to help finance the defense of cases which affect generally the welfare and interests of consulting engineers." Any unused portion of the fund not expended in the instant Wage-Hour case will be retained for similar purposes in the future.

Chairman Gates suggested contributions in the range of $25 to $500, "depending upon the size of your organization, your ability to contribute and your feelings concerning the value of the outcome of the present proceeding and similar ones in the future."

Contributions should be made payable to the "NSPE Consultants' Special Legal Fund," and mailed to that name, care of NSPE, 2029 K Street, N.W., Washington 6, D. C.

N.S.P.E. Believes

The Engineering Technician

By Paul H. Robbins, P. E.

Executive Director

N. S. P. E.

THE role of the engineering technician has been the subject of increasing discussions in engineering circles for some time. Because of the ramifications of the import of the engineering technician, these discussions range from the question of definition through education and their organizational place on the engineering team. There are many in the profession who feel that the discussions of requirements for engineering and scientific brainpower are seriously confused by a failure to distinguish between work which requires four or more years of college education and that scientific and engineering work which could be done with lesser, more specialized training. When one hears estimates of the number of "engineers" in the nation and analyzes the breakdown of educational qualifications of those holding these jobs, the requirements for engineering technicians take on even more significance.

The discussions of the nation's need for engineering technicians have ranged from the halls of Congress through educational, engineering, and scientific circles to management seminars and personnel conferences. One of the task forces of the President's Committee is directing its entire attention to this important facet of the engineering and scientific community. NSPE believes that the relationship of the engineering technician to the professional engineer has considerable bearing on the professional status of all members of the profession. It is for this reason that the Society has created a committee to study the several aspects of the role of the engineering technician.

Basically, the work of this committee can be divided into three major categories. It is difficult to divorce any of these three aspects from the others, or to place them in a priority of consideration. Nevertheless, it is probably most imperative to determine the responsibility of the professional engineer for the development, encouragement, and education of the engineering technician. This is one of the areas the committee will consider. Most discussions on this subject lead to the conclusion that the engineering and scientific community will rely more heavily in the future on supporting personnel. Engineering and scientific efforts are becoming more complex to the extent that individual specialization with lesser requirements for specific tasks may well be the trend of future development. If, as conceived by these discussions, the number of supporting personnel is to increase, NSPE believes it will be increasingly imperative that the professional society be constantly aware of the developments affecting engineering technicians. The role of the professional society in these developments and its concern for assistance in guidance and direction in which the engineering technician may go is a responsibility of which we must be conscious.

In the complex engineering and scientific team of the future, the employment situation of the engineering technician will have a direct bearing on the status and position of the professional engineer. Thus, the Society must be concerned with employment conditions of technicians, their relationship with the professional personnel, and such parallel items as guidance, qualifications, certification, and similar considerations.

The third aspect of the role of this committee concerns itself with the degree to which professional engineers will be concerned with the education of engineering technicians. ECPD has already recognized the importance of this aspect of the engineering team and has accredited a number of engineering technician institutes. For the most part, these institutes either are under the direct supervision of engineering college personnel or professional engineers—well oriented to the role of the engineering technician and its importance in the development of the engineering team. Unfortunately, there are those who see the development of the engineering technician at the level of the trade school, and it will be increasingly important for the engineering profession to be vigilant in maintaining high standards of qualifications in education as well as lines of demarcation between the engineering technician and the skilled mechanic.

Many of NSPE's current activities, of course, have direct bearing on similar concerns for the engineering technician. Many of the policies of NSPE must take into consideration their effect on the engineering technician. Particularly is this true in the realm of legislation, governmental liaison, ethics, and education. It is in these areas that NSPE is looking forward to the extensive area of study challenging its Committee on Engineering Technicians.—**End.**

With Our Members . . .

23rd Chapter

Ventura County Chapter Granted Charter Recently in California

The Ventura County Chapter of the California Society of Professional Engineers was recently granted its charter and thus became the twenty-third chapter of the growing State organization. While the new group has a limited number of charter members, it has a large potential because of its county's location.

In addition to being adjacent to Los Angeles County and thereby feeling the effects of that area's industrial decentralization, it has a number of military installations which employ a large number of engineers. The Navy's Construction Battalion Center at Port Hueneme with its Civil Engineering Research Laboratory along with the Air Missile Test Center at Point Mugu supply the majority of the members of the newly formed group. Municipal and industrial engineering organizations are also represented.

Officers installed to handle the affairs of the Chapter during its first year are: President, W. F. Burkart, head of the Research Department at the Navy Laboratory; Vice President, Benton Turner, Lloyd Corporation petroleum engineer; State Director, C. R. White, civil engineer at the Navy Laboratory; Secretary, G. W. Mikuls, Shell Oil Company mechanical engineer, and Treasurer, J. S. Williams, Navy Laboratory chemical engineer.

Ventura County Chapter Officers

New officers of the Ventura County Chapter of the California SPE are, l. to r.: J. S. Williams, treasurer; G. W. Mikuls, secretary; W. F. Burkart, president, and C. R. White, State director. Vice President Benton Turner was absent at time of photo.

Toledo Society Stages Annual Summer Dance

Nearly 200 members and guests of the Toledo, Ohio, Society of Professional Engineers spent an enjoyable night at the annual summer dance and buffet at the Toledo Edison Club overlooking the Maumee River. President Ralph Gerkins and Program Chairman Elbert J. Leuty made the arrangements. Pool, table tennis, shuffle board provided a variety of entertainment for everyone.

Annual Meeting Held in Pennsylvania

More than 500 persons attended the annual meeting of the Pennsylvania SPE recently in Reading. Left photo: Outgoing and incoming State presidents are shown at a luncheon, l. to r.: Howard F. Rickenbach, toastmaster and program chairman; Hugh M. Nelson, outgoing State president; E. L. Dryer, incoming State president, and Paul H. Robbins, NSPE executive director. Right photo: 1958-59 State officers are, l. to r. (seated): John W. Magoun, treasurer; Mr. Dryer, president; John T. West, Jr., secretary; (standing, all vice presidents) Donald D. Smith, Northeastern Area; Kenneth H. Caskey, Central Area; Marcel M. Fertig, Southwestern Area, and Frank W. A. Myers, Southeastern Area. Glenn L. Shorts, vice president, Northwestern Area, was absent at time of photo.

By Mrs. Garvin H. Dyer, Chairman of the Ladies Auxiliary Advisory Committee.

September means resuming activities for most auxiliaries, and we are expecting the coming year to be the most active and fruitful in our history. Many new auxiliaries are expected to be formed this year, and present organizations have plans formed for expanded activities in many fields.

The Tulsa, Oklahoma, Auxiliary is planning to open their year with a guest tea, at which all the state officers are to be present. This is their money-making event to raise money for their scholarship.

Two auxiliaries in the Southeastern Area have assisted in their state meetings this summer. The Columbia, S. C., Auxiliary played hostess to the ladies attending the South Carolina meeting in June. A highlight of the meeting was a reception honoring the engineer wives at the home of Mrs. Marcus H. Durlach, Jr., the retiring president of the Columbia Auxiliary. Since every chapter in the State has an auxiliary the meeting was well attended.

The Southeast Georgia Auxiliary were hostesses to the women attending the Georgia State meeting in Jekyll Island in June. The auxiliaries and their officers were given recognition at the joint installation luncheon on June 22. Mrs. H. P. Derry, State chairman for auxiliaries, introduced Mrs. Garvin H. Dyer, national chairman of the Ladies Advisory Committee, who spoke briefly. Georgia women are becoming very active in auxiliary work, and half of the chapters in the State now have an auxiliary.

All news for the "With the Auxiliaries" column should be sent directly to Mrs. Garvin H. Dyer, 10011 East 36th St., Independence, Mo.

Ohio Group Holds Recent Ladies Night Banquet

Three firsts were established this year at the Ladies Night Banquet of the Jefferson County (Ohio) Society of Professional Engineers.

The meeting was the Society's first Ladies Night to be addressed by a speaker from out of the state. Although the speaker has appeared before many groups in Pennsylvania and New York with a cumulative attendance of 75,000, this meeting was the first that he had addressed in Ohio. And it was the first Ladies Night at which the attendance exceeded the chapter membership.

P. E. Gismondi, a member of the Buffalo Society of Professional Engineers, and public relations director of the Niagara Frontier Chapter of the American Society of Safety Engineers, spoke on the subject, "The 4th E of Traffic Safety and the Ten Commandments."

The address was concluded by a movie produced for the American Safety Council which supplemented Mr. Gismondi's remarks.

L. C. Goddard Named Illinois Ex. Secretary

Lawrence C. Goddard, of Jefferson City, Missouri, has been named executive secretary of the Illinois Society of Professional Engineers. Announcement of the appointment was made by Frank W. Edwards, Chicago, Society president. Mr. Goddard succeeds P. F. Roberts, of Champaign.

The newly named official whose appointment became effective August 1, recently resigned as administrative assistant of the Associated General Contractors of Missouri to take the post with ISPE.

The 39-year-old appointee is a native of Tennessee, attended school in Knoxville, and received an LLB degree in 1950 from the University of Tennessee. He served as publicity director for the University of Tennessee Athletic Association and executive secretary of the Service Station Association in that state. Prior to his work in Missouri he practiced law for seven years.

San Jacinto Chapter Hears Dean A. R. Sims

The engineering technician was discussed in all his ramifications by Dean A. Ray Sims of the University of Houston College of Technology at a recent meeting of the San Jacinto Chapter of the Texas Society of Professional Engineers.

Dean Sims told the ninety professional engineers attending who an engineering technician is, what he does on the modern engineering team, how he is educated and trained, and the trend of opportunity in the field. He particularly called the engineers' attention to the importance of this man and the desirability of having his status proclaimed as important. Dean Sims drew a very vivid comparison between the engineering technician and the technical aids used by the medical profession and the legal profession.

New California Chapter

Halwyn R. Smith, left, president of the Riverside-San Bernardino Chapter of the California SPE, receives a charter from Norman H. Barker, right, on behalf of the California Society. Robert F. Rocco, president of the Orange County Chapter looks on.

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HENNINGER

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considered as the "dumping ground" for misfit Ph.D.'s or scientists. These intimately and inseparably interrelated fields of human endeavor are co-equal in their importance to our social and economic—and professional—structure. They and the people in them—and the people who should be in them to give us the effective and satisfying balance of manpower distribution needed for our way of life—deserve to be accorded interrelated status and recognition accordingly.

Need for Technicians

I should like to discuss briefly this matter of need for technicians. And more specifically about the engineering technician, reminding you again that the philosophy applies also to other technologies although the numerics may vary. I wish to remind you also, that in many other professional and technical fields, the technician and the "technical-institute idea" in higher education have received far more recognition than in engineering. Among these are such as the long-established medical technician, the newer dental technician; technicians in business operations, the fields of accounting, secretarial science, personnel supervision, and others.

There are two aspects of this question of "need" which are of significance to us in the engineering profession. There is the growing numerical need, to serve the composite and mutual interests of our social and economic structure. This means more people adequately and appropriately educated in the fundamentals of science and trained and inspired in technological thinking. Also, there is the socio-psychological need and opportunity to develop more people to personal capacities more appropriate to their individual aptitudes and interests. This is of importance from both the individual and the community standpoint.

This leads me to a passing comment upon the "engineer-in-training" aspect of the NSPE program of professional recognition. This program emphasizes the idea that even the best of our traditional 4-year engineering graduates is only "book-learned" and needs the pre-professional application period to develop and to reveal the extent of his qualities and aptitudes.

SOMEWHAT in contrast with this, there are the similar programs which have prevailed in American industry since the beginnings of engineering. Traditionally, these programs have brought engineering graduates into protracted "training periods" of routine shop or drafting-room work much of which is well below the level expected of today's engineering technician. In practice, such programs provide technical manpower on a cheap basis. In effect they constitute a psychological, as well as physical, waste of manpower and talent. The more alert industrial concerns have quit this wasteful practice, and make appropriate use of engineering technicians for the technical work and trained mechanics for the manual work. Their engineering graduate trainees are placed in engineering work for engineering experience and training. But, much of American industry has *not yet* learned that this is the effective and efficient way to use an engineer's time and education.

We have been caught in the pressure-wave of rapidly expanding and changing science and technology. With too-few exceptions, we have been allowing ourselves to be swept along both educationally and professionally with our minds pre-set on, and preocupied with, a technological manpower structure no longer adequate. Although warm with associations which have become dear to many of us, our traditional concept of engineering is no longer appropriate, either educationally or professionally. If we are to exert or deserve the leadership to which we in NSPE properly aspire, our concepts of our manpower spectrum must be geared to the-day-after-tomorrow, rather than to the-day-before-yesterday.

As we climb our ladder of professional attainment, recognition, and status, it behooves us to take care lest we float off with our heads in the clouds and allow the necessary foot of our ladder to become disassociated from the ground —the solid and inescapable earth—the good earth. When we build ourselves a house, we don't sit on the roof and proclaim to the world what a wonderful roof has come into our life! Quite the contrary! We proudly take our friends through the structure literally from cellar to garret. We point with pride to the fact that every pebble in the foundation and every component in the structure was expressly developed and placed to produce a wholeness of structure in which every one of its many elements *each* serves effectively the manifold needs which make up the wholeness of the life that is to go on in the structure.

We can ill afford to do less with our professional manpower structure. In this rapidly moving world of ours we cannot afford the costly fun of playing ostrich and kidding ourselves into thinking that the engineering technician is anything other than an inseparable part of our professional engineering family. And beware also of thinking of him as a "lowly part," for tomorrow much of your work of today in the exacting realm of engineering science will have been developed to an application technology which can be performed more effectively and more satisfyingly by a properly qualified engineering technician. As the frontiers of engineering science move on, there must be an every-growing "army of occupation" to keep the engineering enterprise operating and growing. NSPE can ill afford to relinquish this manpower area to other agencies which already sense the situation and are moving accordingly.

We have too greatly succumbed to the allurements of producing all "chiefs" whereas we need a lot of mighty good "indians" developed on levels of comparable quality. Much is being said about the seemingly over-large proportion of our high school graduates who do not go on into higher education. Among the reasons which should concern us in NSPE has been the fact that many of these persons having technological interests and aptitudes did *not*—and do *not*—want four years of college. And logically so. They want to *do* something—they want applied science or what we are coming to call the "technologies." Consequently, professional recognition of this intermediate area of the over-all professional spectrum of engineering and scientific manpower is clearly indicated. Similarly, professional recognition of the "technical-institute idea" in higher education provides a logical channel for the expansion of our total technological manpower without any "watering-down."

Better Manpower Balance

The numerics of this situation may be indicated by the fact that in our present national economy we have a confirmed need for qualified and properly prepared technicians in engineering and related technologies which numerically exceeds by several times the much-talked-about need for scientists and engineers.

In fact, one of the most productive ways to increase our effective supply of engineering-scientific professional manpower is through the integrated development and utilization of persons qualified to be engineering technicians. We must

have the courage to turn over to the engineering technician all segments of yesterday's engineering and science which have become today's technologies. And we must recognize that these are very large segments. By doing this methodically and determinedly, we would correspondingly release the time and energies of our qualified engineering-scientific manpower. These, then, could extend and expand their competence and creative abilities in application to the frontier problems of today's science and tomorrow's engineering. This would conserve manpower because only two years of curricular work are required to develop an engineering technician in contrast with the requirement of four or more years to develop the engineer or scientist. Further, we thus take into account that somewhat intangible, but very important, factor of the personal and community value of having a person in a job which challenges and inspires him because it is in keeping with his interests and aptitudes. This relates intimately to the unionization movement in engineering and science.

Such evolution naturally involves problems. But we must remember that the problems are *not created* by this evolution, *merely revealed*. Such problems as are encountered exist anyway. And, problems faced and solved while small—even if with some pain—never become big problems with devastating anguish. Further, many problems are the outgrowth of fears, and these can be ventilated and dissipated by rational thinking. For example, the fear has been expressed to me that "if we go along with this 'engineering team' idea, and accept engineering technicians as assistants to carry some of the load that we have been carrying, we should guard against their learning too much about our jobs lest they get our jobs away from us." This is an understandable reaction, but not a very searching one. If such a fear represent any real hazard with reference to any particular job, the answer probably lies in the fact that the job is not one requiring an engineer as now conceived, and thought should be given to that aspect. Again, the fear has been expressed to me in engineering education that recognition of the engineering technician and participation in the technical institute zone of education would pollute and stultify the institution and its programs. This groundless fear in collegiate and professional circles has been dissipated markedly within the past year, on the basis of the fruitful experiences of leaders among the institutions of higher learning, and we now find a definite trend of increasing participation in technical-institute curricula designed to produce engineering technicians.

To help to get our thoughts properly focused upon our apparent problem area, let's make another approach from a different angle. Many of you readers are or have been on engineering licensing boards, or on accreditation committees of Engineers' Council for Professional Development. What professional engineering standing would you give to a recently graduated candidate who stood before you today fresh from an engineering curriculum of 1890, or 1900, or 1920 when, for example, foundry technique was an important item in the mechanical engineering curriculum, and the actual winding of an electric motor was an important item in the electrical engineering curriculum? Intrinsically, these and other such items are just as important today as they were then, but their relative position in the expanding area of engineering and science is significantly different. Times have changed and are still changing; frontiers have moved, and are still moving. Our manpower concepts, both social and professional, must keep pace.

If we of the engineering profession can but remember the history of our own brief existence, we should be able to recognize the plight of the engineering technician today in needing professional recognition. Just a few decades ago, our engineering profession was in exactly the same relative position when it was striving for its "place in the sun"—for recognition and acknowledgement of respectability in a long-established hierarchy and cloistered tradition of higher education in a classical sense.

What Schools?

Let's consider briefly the question of what schools are, or should be, concerned with this technological education.

First, we must record and acknowledge the fact that American industry as a whole has developed a tremendous internal training and educational program. In level, these range from trade apprenticeship training to the highest levels of collegiate graduate work. In subject matter, these programs range from manual skill training to industrial management and from English and speech to nuclear theory. The universal objective is to develop available manpower to meet the needs and philosophies of the individual enterprise. In our National Survey of Technical Institute Education, we specifically refrained from any attempt to assay this huge phase of America's over-all pattern of education. This would be a job in itself. However, we must not overlook it, especially when making internal comparisons.

The senior colleges and universities of the United States, with few exceptions, have preoccupied themselves with baccalaureate and advanced-degree programs to the exclusion of technological curricula designed to develop technicians in engineering and other subject fields. However, we now find that an increasing number of colleges and universities are recognizing the significance and potential of this intermediate zone of higher education by now offering technical-institute curricula, or by being actively engaged in their development for an early offering.

The junior or community college in the United States is, with but minor exceptions, just at the threshold of any significant participation. In potential, however, it cannot and should not be ignored, especially in the light of rapidly increasing requirements for educational capacity. Basically, it is a multi-purpose institution. Statistically, it is overwhelmingly concerned with "general education" objectives as represented by "liberal arts" and "college-transfer" programs. Too many of those showing interest in technical subject matter thoroughly confuse the significant distinction between effective technical-institute curricula on the one hand, and vocational-trade curricula and "shop" courses on the other hand. In any event, what the junior college in the U. S. can do, or should try to do in the area of technological curricula for engineering and other technicians, depends entirely upon the circumstances—the leadership, and the philosophy controlling each individual institution.

From the facts thus briefly summarized and necessarily over-simplified, we discover that it is the independent technical school which has "carried the ball" of intermediate technological education and given continuity to the "technical-institute idea" of organized occupational curricula since its introduction into the United States, prior to the turn of the century. We should not be surprised at this, for traditionally it has been the independent educational institution which has pioneered new concepts, new areas, and new methods of education. The independent institution occupies a position of especial opportunity and responsibility because of the inherent privilege of relative freedom and flexibility in policy and procedure which it enjoys.

Let's take a quick glance at the history of the "technical-institute idea" in the United States.

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STRICTLY BUSINESS

Personalities . . . **George Steven** has been named general manager of the Compressor & Engine Division of **Worthington Corporation,** Buffalo, N. Y. He replaces **Austin C. Ross** who has retired after serving the corporation for twent-six years . . . **Charles L. Long** has been appointed to head the Project Engineering Department of **Chainveyor Corporation** with headquarters in Los Angeles, Calif. . . . Four new appointments to the computer engineering staff of **Control Data Corporation,** Minneapolis, Minn., have been announced by **Frank C. Mullaney,** director of engineering. They are: **James E. Thornton, Carl E. Koehler, Dean M. Roush,** and **James D. Harris . . . J. V. Howell, Jr.,** has joined **Packard-Bell Computer Corporation** as a project engineer, according to **Richard B. Leng,** president of the **Packard-Bell Electronics** subsidiary . . . **John E. Jacobs,** general manager of the Lackawanna, N. Y., plant of **Bethlehem Steel Company,** has been appointed assistant vice president of the company's steel division with headquarters in Bethlehem, Pa. . . . The appointment of **John Aldred** as chief engineer of **Sherman Products, Inc.,** Royal Oak, Mich., has been announced . . . **Dr. Walter Welkowitz** has been named director of engineering for the Vibro-Ceramics Division, **Gulton Industries, Inc.,** Metuchen, N. J.

Mr. Steven

Charles J. Jacobus has been appointed chief engineer for the Trojan tractor shovel line manufactured by **The Yale & Towne Manufacturing Company** at its Batavia, N. Y., and San Leandro, Calif., plants . . . **Joseph J. Ranna** has been promoted to manager of the New Orleans district sales office of **A. M. Lockett & Company, Ltd.,** sales subsidiary of **The Babcock & Wilcox Company . . . Harrison R. MacLeod** has been appointed chief engineer of the **Colson Corporation's** new Jonesboro, Ark., plant, it has been announced by **Jack J. Begley,** vice president. . . . **George Tooby,** president of **Computer Engineering Associates, Inc.,** Pasadena, Calif., announces the appointment of **Dr. Richard H. MacNeal** as manager of the Engineering Services Division . . . **Robert A. Thompson** has been named operations manager of **Dravo Corporation's** Contracting Division, Pittsburgh, Pa. . . . **Philip A. Weygandt** has been appointed to the new post of district engineer in the Midwest sales office of **Clevite Transistor Products,** Waltham, Mass., a division of **Clevite Corporations** . . . The appointments of **D. J. Goodreau** as plant engineer and **William Cord** as product design engineer for **Adams Engineering Company, Inc.,** Miami, Fla., have been announced . . . **Earl T. Andes** has joined **Task Corporation** as a project engineer, **Elmer F. Ward,** president of the Anaheim, Calif., firm has announced . . . **Ray L. Reid** has been named assistant chief engineer of **Ling Electronics, Inc.,** Culver City, Calif.

Mr. MacLeod

The election of **Bruce L. Mims** as vice president-engineering of the **Barden Corporation** has been announced by **J. Robert Tomlinson,** president . . . The **American Institute of Steel Construction** has announced the appointment of **Clyde Guder** as district engineer for the St. Louis area . . . **Brigadier General William L. Bayer,** U. S. Army, retired, has been appointed director of planning of the Electronics Division of **Stromberg-Carlson** a division of **General Dynamics Corporation** . . . The **Concrete Reinforcing Steel Institute,** Chicago, Ill., has announced that **Paul F. Rice** will join their staff as assistant to the managing director . . . **James D. Ghesquiere** has been named vice president in charge of engineering for **The Hinchman Corporation,** Detroit, Mich. . . . The association of **J. B. Blackburn** with the firm of **Harland Bartholomew and Associates,** St. Louis, Mo., has been announced by the organization's founder and head, **Harland Bartholomew** . . . The board of directors of **Milton Roy Company,** Philadelphia, Pa., has elected **Paul Gibian** as vice president of manufacturing . . . **Grover S. Ramsey** has been assigned sales representative in Michigan for **B. F. Goodrich Chemical Company,** with headquarters in Detroit . . . The election of **Warren B. Hayes** as vice president of **Pacific Semiconductors, Inc.,** Culver City, Calif., has been announced.

Mr. Blackburn

New Firms . . . A new consulting firm has been organized under the name **Patchen, Mingledorff and Williams,** Augusta, Ga. The partnership will consist of **Joseph C. Patchen, Frank C. Mindledorff** and **C. D. Williams . . . Walter Lambert, Jr.,** announces the opening of a consulting office in Charleston, W. Va. . . . **Francis L. Brown,** formerly deputy superintendent of Public Works for New York State and senior partner of Brown and Blauvelt, has announced the formation of **Brown Engineers** and **Brown Engineers International** with headquarters in New York, N. Y.

Expansion . . . **H. E. Bovay, Jr., Consulting Engineers,** announces the following organizational changes: **Bennett W. Burns,** partner, will assume the duties of managing partner, Houston; **S. J. Bell,** associate, will take up Mr. Burns' former duties as chief engineer, Houston; **Guy Furgiuele,** associate, will become assistant chief engineer, Houston; **L. S. Curtis** will be made an associate in the firm and assistant to **Mr. Bovay,** and **Morris Backer** will succeed **Mr. Furgiuele** as head of the air conditioning and plumbing design divisions . . . **Vogt, Ivers, Seaman & Associates** announce the establishment of a new branch office under the direction of **Robert Williamson, Jr.,** in Charleston, W. Va. . . . **Prestressing, Incorporated,** San Antonio, Tex., has formed a new division, Spanblok, according to an announcement from **James J. Mennis,** president. **Harvey R. Livesay, Jr.,** has been named manager of the division.

HENNINGER

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THE "idea" of the technical institute as we know it today was introduced into the U. S. educational pattern by Frederick Pratt in 1895. The idea was a direct adaptation from the well-established "technikum" of Germany which had been personally visited and studied for just this purpose by Pratt and an assistant. The core of this "idea" was a pattern of curricula built up of an integrated sequence of courses of technological subject matter and related shop and laboratory experimental work. The level and nature of subject matter instruction distinguished it from the vocational-trade area of educational effort. The curricular continuity distinguished it from the lecture-series and self-study pattern of the then-popular "mechanics institute" or "athenaeum" from which several of our prominent technical institutes have evolved. The basic two-year pattern and the emphasis upon practical application of the then-emerging engineering sciences, and of other sciences and technologies, distinguished these curricula from the college and university pattern. The level of instruction and the entrance requirements distinguished it from the vocational or technical high school which then was beginning to emerge in the pattern of U. S. secondary education.

For example, at Pratt Institute those first technical-institute curricula were designed for adults, mature and experienced industrial craftsmen of age thirty or so. Entrance requirements were such that even a high school graduate needed at least two years of industrial experience to qualify. This is of some particular interest here, because when Pratt Institute was first established in 1877 it was set up as a vocational high school and operated as such until 1892. Irving Langmuir, the noted engineer and scientist, earned his high school diploma from that school. In 1892, when New York City became interested in adding a vocational high school to its growing secondary system, the Pratt family turned over to the city its whole trade-technical vocational program complete with faculty. This left the Pratt family with only their art school and "domestic science" school. These served as the nucleus around which the pattern of engineering and scientific technologies, adapted from the German technikum, was assembled in the evolution and establishment of the "technical-institute idea" of basically two-year applied-science curricula, as now known.

Preliminary and incomplete returns from our recent National Survey reveal a total of approximately 120 educational institutions which might loosely be called "technical institutes." Some of them operate under that title. Of this total we find 35 operating in 51 different locations in 16 states, offering a total of 109 Technical Institute Curricula recognized and accredited by Engineers' Council for Professional Development. In addition, we find some 50 junior or "community" colleges and 35 other public, private, or industrial schools offering curricula of approximately equivalent nature. Beyond this, we find a large miscellany of schools including many junior colleges offering a variety of vocational-trade courses of such a nature as to develop mechanics rather than engineering technicians. Some of these schools erroneously call themselves technical institutes.

Among our gross of 120 schools, we find some 75 public tax-supported institutions and some 45 independent institutions. Thirty years ago—at the time of the last national survey of technical institute education by ASEE—the figures were: 11 public and 30 private institutions including evening schools. Several universities and engineering colleges are operating very effective technical-institute programs. As of 1956, this group of schools showed a total enrollment of approximately 48,000. This means about 11,000 engineering technicians graduate annually. This is only about ten per cent of the total indicated potential need.

I mention the "potential" aspects here for two reasons: First, because naturally where qualified technician graduates are not available make-shift measures are serving as fill-in, and hence to the casual observer the situation may seem to be in balance; second, because, in spite of pioneering examples of outstanding significance, both industry and the professions in general are only beginning to understand or acknowledge the inevitable place of the graduate technician in the manpower spectrum. Beyond the meager supply currently being graduated by recognized technical institutes, today's needs for engineering technicians are being met partly by misapplication of graduate engineers, and partly by mechanics and others upgraded carelessly to capitalize upon the allure of the title "engineer" and the looseness of cost-plus contracts.

IN any event, it is becoming very clear that, for the good of our national economy in the light of our total manpower potential, we are rapidly approaching the time when our technological manpower team will be composed of something like ten engineering technicians and 150 skilled mechanics for each engineer or scientist. With this picture becoming recognized, I have been told by some engineering educators that "we cannot afford to have technical-institute curricula in our colleges because with a 10-to-1 competition for available higher-education dollars, the engineering technicians and their technical institutes would get most of the dollars." Similarly, I have had the fear expressed to me that "we can't afford to dilute our professional society—that with any such ratio we engineers would lose control of our own society."

My reaction to these thoughtless but understandable fears is that if the 10-to-1 ratio be "dangerous" in any respect, it is much more dangerous outside than inside. Inside, our total technological family can be coordinated in proper balance to mutual benefit and to the best interests of our national welfare and security. Outside, the dollars will be even more likely to flow, pre-empted through such tax programs as that now contemplated in the current proposals for Federally-supported "area vocational schools." Outside, the 10-to-1 ratio of people will be prime targets for the unionization effort which already is a major headache and hazard in the professional engineering and scientific area.

As to the facts of life which confront us, we may close our eyes to them, but they will still exist.

These may be summarized and epitomized by paraphrasing an earlier statement: In spite of our "exploding" population in the U. S., the manpower requirements of our "exploding" scientific and engineering frontiers are such that not enough persons are being born to go through our traditional educational cycle and give us anywhere near the quantity of technological graduates which we need under our traditional and outmoded methods of education and utilization.

Something needs to be done—and done on a long-range basis. We do not need a "crash" program unless it be a crash to awaken us and jar us into courageous and intelligent action. Are we in NSPE going to sit by and let someone else do this, in our own engineering-scientific field? Responsibility is implicit in our assumption of responsibility and demand for recognition. The opportunity is here—now.

And this reminds me of a pertinent observation which I had the privilege of hearing personally from Charles F. Kettering. He said: "The main reason for the unpleasant surprises which we discover each day lies in the fact that we spend so much time walking backward watching with pride where we have come from!"—**End.**

PIPER

(Continued from page 14)

enko asked for our criticism of Soviet building construction methods and he was quite disappointed when he was given little criticism.

We had told him that we noted poor quality of concrete in some places, but that we would prefer to send him a fuller report when our delegation had time to compare opinions and compile a comprehensive report.

Mr. Kucherenko said that he was aware that the quality of Soviet concrete was relatively poor. One reason for this fact, he disclosed, was that skilled construction workers who build factories prefer to stay on and work in the completed factory. This means that new construction workers must constantly be trained.

Another problem of concern to him were aggregates for the production of concrete. So far these have made up one-fifth of the cost for all concrete in place. He was interested to know whether we had found a way to produce concrete without the use of aggregates.

He also stated that they had found prestressed concrete fifteen per cent cheaper than steel trusses and that by 1965 under his new seven-year plan, twenty per cent of all concrete production will be prestressed. He concluded by telling us that he had just ordered a complete steel design staff to design only in concrete in the future.

On an intensified tour of this kind, one gets many conflicting pieces of data and impressions. However, here are some broad generalizations for the reader:

While the Russians have made great progress in improving their living conditions, as evidenced by their new apartment projects, conditions were much worse than some of our group had expected. The appearance of everything was rather drab and colorless — clothing, housing, shops, and landscape.

Although we were treated very well (we were entertained in luxurious engineering clubs, at an opera, a ballet, a soccer game and a circus), the food was not very attractive. I managed to lose ten pounds in the ten-day tour. Everywhere we went, we saw lines of people waiting for hours in front of milk stores and meat markets.

Since our hosts were always congenial and our reports were well received by architects and engineers alike, I feel that we made some progress toward developing mutual understanding.

Over-all, I think the Russians may be ahead of us in the practical applications of prestressed concrete, because their governmental system permits them to dictate what construction will be used. However, I do not believe that they are ahead of us in design techniques and certainly they are far behind us in construction techniques. Obviously, they make little attempt to secure a finished appearance in their products although the quality of their products is improving. **—End.**

NSPE FILM

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here that the individual engineer, working with his colleagues, comes up against the problems and situations that cross all lines of specialization —problems and situations that are common to the entire profession."

The film was produced for the National Society by Sid Alpert Productions, of Washington, D. C. It is narrated by John Batchelder, a network radio and television announcer. Scenes of engineers at work were contributed by the Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota.

All prints of the film should be reserved directly from the National Society headquarters in Washington, D. C.

ENGINEERS' WEEK

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A limited number of prints of the United States Steel Corporation film, "Mackinac Bridge Diary," will be made available to NSPE groups for showing during the week of February 22-28. This 16mm color film follows the step by step construction of the newly completed Mackinac Bridge in Michigan. Appearing in the film is Dr. D. B. Steinman, designer of the bridge, and first president of NSPE. Further details on this film will be carried in subsequent issues of the Action Letter and in the October issue of the AMERICAN ENGINEER.

The 20-minute color film "American Engineer" will once again be available for showing during the Week. Produced for Chevrolet by The Jam Handy Organization, the film is a tribute to engineers in all fields. Prints of the film may be reserved directly from the producers at 2821 East Grand Boulevard, Detroit 11, Michigan.

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JENKINS-KEOGH

(Continued from page 23)

significant achievement could not have been possible without their splendid cooperation. The principle of Jenkins-Keogh, encouraging the establishment of retirement plans by the self-employed, has been before Congress for many years, but its passage by the House represents the outstanding progress achieved thus far. This latest development indicates a growing awareness on the part of the members of Congress, and their constituents, of the vital role in our economy and way of life played by the resourceful, ambitious, self-reliant and individualistic self-employed segments of our population," Mr. Vogt added.

"While the overwhelming House passage of the Jenkins-Keogh Bill (H.R. 10) on July 29, 1958, represents a significant step toward achieving a measure of tax equality for this nation's ten million self-employed business and professional men, the contemplated Congressional adjournment date of mid-August requires that the Jenkins-Keogh principle be pressed with the utmost vigor in the Senate in order to achieve a measure of success this year. In any event, the overwhelming margin of victory in the House is a fine tribute to the work of the American Thrift Assembly and its member organizations. I am proud of the fact that consulting engineers, through financial and other means of support, have significantly participated in this endeavor for the betterment of self-employed professional and businessmen everywhere."

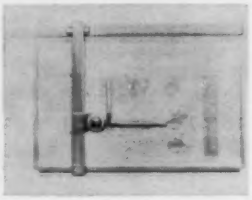
What's New

This column describes new products of general interest to professional engineers. For further information, circle the item number on opposite page and mail to the AMERICAN ENGINEER.

These listings are informational and are not an endorsement of the products, nor of the manufacturer's claims.

UNIVERSAL TRACMASTER — Item 30

The Universal Tracmaster is an X-Y Track Drafting Machine that provides graduated track settings, in addition to all the usual angular and dimensional measurements possible with the customary drafting machine protractor and scales. On each track, numbered graduations are provided at precise 10-inch intervals—for quick, easy reckoning. In effect, these track graduations divide the entire drawing area into a 10-inch pattern.

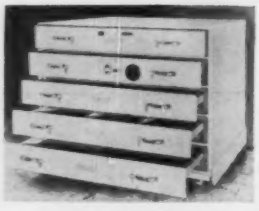


WATERPROOF PAPER — Item 31

A complete line of waterproof Engineers Field Books for year around use in any weather conditions has been announced. "Rite in the Rain" waterproof paper is chemically impregnated to make it completely waterproof at the same time retaining its writing surface, the manufacturer claims. Ruled forms are printed with blue-green inks for greater marking contrasts and less eye strain.

FIREPROOF FILE — Item 32

A fireproof and burglarproof file is now offered by the Charles Bruning Company, Inc. Valuable drawings and maps can be protected from fire and theft without the necessity of building a vault or purchasing a large safe. Drawings as large as 31″ x 42″ can be protected in this unit. This file is equipped with a key lock at the handle and a drill proof steel plate located ahead of all locking mechanism.

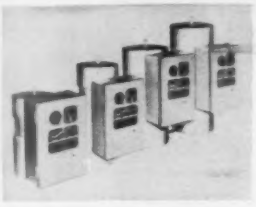


FLOW INDICATOR — Item 33

A simple, reliable safety signal in a recently announced flow indicator shows quickly whether flow is taking place. Clearly visible from a distance even in a bad light, a chromium plated ring spinning under a toughened glass dome has definite movement which precludes chance of misreading. Useful wherever there is circulating water or oil, some specific applications are cooling water to engines, air compressors, condensers; cooling oil to transformers; lubricating oil to bearings, gear trains, etc.

COMPACT CHARGERS — Item 34

Taking up about one-third the floor space of comparable horizontal battery chargers, this new "Family of Four" series offered by Exide comes in four physical sizes, twenty-five different electrical ranges. Designed for compactness and economy, without sacrifice of important charger features, the units are designed for use with electric industrial truck batteries of from six to eighteen cells.

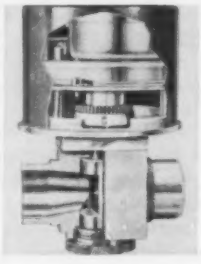


UNDERWATER MOTOR — Item 35

A motor designed for use under water—allowing the insulation system of its windings, bearings and magnetic components to be totally immersed—has been announced by General Electric. The "Wet" motor is claimed to be the first of its type to be designed and produced by an American company. A new insulation system using irradiated polyethylene was the major factor in development.

MOTORIZED VALVE — Item 36

Regent Engineering Co. announces its new motorized valve. Operating on low voltage upon a signal from its own thermostat this small compact and powerful valve provides for automatic multiple zone control on any new or existing hot water heating system. Its slow cycle of operation produces a desirable modulating effect. It draws no current in either the open or closed position.



PARALLEL LINER — Item 37

Eldorado Products Company, Inc., has announced the introduction of its Parallel Liner, a precise automatic ruling device for engineers and draftsmen. It is said to be an accurate instrument for drawing parallel and equidistant lines with great speed. Spacings between lines are obtained automatically by setting an indicator to any of eleven desired distances marked on a small round indicator disk. Unlimited additional spacings are available by in-between settings.

American Engineer

PROFESSIONAL ENGINEER...

Are you busy? . . . Need more information?

Keeping up-to-date on new products and new developments is a "must" for the registered, professional engineer. With this thought in mind, the AMERICAN ENGINEER recently initiated a READERS' SERVICE DEPARTMENT for its more than 46,000 readers—and the response has been overwhelming!

WHAT'S THE STORY?

The story is just this: to take advantage of our READERS' SERVICE DEPARTMENT you must first read the advertisements in this issue and note that each ad makes reference to a number on the coupon below. If you want more information about any product simply circle the corresponding number on the handy coupon—and MAIL TODAY! We will forward your requests to the advertiser and the information will then be sent *directly to you*. It's easy, try it.

A boon to the busy engineer!

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2029 K Street, N.W.
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SEPTEMBER, 1958

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EUGENE B POWER
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A nurse nudged us to action

"We ought to tell *all* our people about U.S. Savings Bonds as regularly as we tell them about safety," said our nurse in the first aid room. "Many of the men and women who come in here don't even know we have a Payroll Savings Plan."

We had to admit she was right. And when we called our State Savings Bond Director, he agreed with her. He helped us set up a company-wide information plan that tells every employee —frequently—about the advantages of buying U.S. Savings Bonds systematically.

That was just a few days ago. Today we have the largest employee participation we've had since the mid-forties. People always welcome a chance to make use of this sound and simple savings plan. Today there are more payroll savers than ever before in peacetime. Look up *your* State Director in the phone book or write: Savings Bonds Division, U.S. Treasury Dept., Washington, D. C.